PACIFIC DISCOVERY

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PACIFIC DISCOVERY

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PRE-DISCOVERY

The anniversary of Benjamin Franklin is a good time to bear in mind the ever increasing need for trained men and women in the sciences. But while we think in terms of training opportunities as a matter of course these days, it might be worth something to consider, more than we generally do, an essential ingredient of *scientists,* as opposed to mere science technicians, which has little to do with training. What we mean is a certain quality of mind, which one is doubtless born with or not, but which will develop – or not – we believe, according to the climate it grows in. Intellectual climate must have had some influence on the boy, Alexander von Humboldt. See what this favored youth had at 16 (we quote from the recent biography by Helmut de Terra, reviewed in this issue): ". . . He attended lectures in physics and philosophy which the physician Marcus Herz presented in his home. As Willdenow had given Alexander his first grounding in botany, Herz first acquainted him with physics, and especially electricity. In the Herz home he was shown the epoch-making experiments of Benjamin Franklin and Count Alessandro Volta. . . . Men like Franklin were pointing the way, and so was Immanuel Kant, the philosopher at Königsberg, with his new theory of planetary origins. Captain Cook was navigating uncharted lands again, and Maupertuis had measured geographic latitudes in Lapland. A Frenchman, Antoine-Laurent Lavoisier, had recognized the importance of oxygen in the transformation of chemical elements, and James Watt in England was rumored to have perfected a steam engine. In the learned circle of Dr. Herz it seemed to young Alexander that the world was being re-created with boundless horizons."

Every American boy, we firmly believe, should have an old jalopy to take apart and put together, if he is so inclined. Our own 11-year-old is already experimenting on his bicycle and an old projector out of the Planetarium shop junk box. But too often the American boy will wind up with a hot rod, and nothing else but a well-developed aptitude for mechanics. That is all very good as far as it goes, but it alone will not make a scientist out of him. or a well rounded man whatever his ultimate occupation. Look at the full depth, breadth, and stature of a Franklin, a Humboldt, a James Cook, even – he was much more than just a supremely skilful navigator. Men these were who absorbed the sparks from charged minds and crackling events around them, generating new ideas and creating new currents of action in their turn. If only all our young hopefuls could glimpse their horizons from some "learned circle!" At least we can guarantee them a view free of our own prejudices and limitations.

PD'S AUTHORS

Another fascinating article has come out of the recent Mexican and Central American researches in ethnozoölogy of **Dr. Lloyd Glenn Ingles,** head of Life Sciences at Fresno State College. . . . ¶**Miss Joan Parry,** who comes from Herefordshire and is as English as she can be despite six North American years, is a botanical explorer at heart. With free-lance writing and occasional settling down (she is currently information officer at the British Consulate, San Francisco), she has managed to cover a good deal of the American West in the tracks of earlier explorers. . . . ¶**Dr. Robert R. Harry** is research director of the George Vanderbilt Foundation at Stanford University, a research organization devoted to tropical biology, especially South Pacific fishes. It will be recalled that George Vanderbilt sponsored an expedition to the Hawaiian and Line islands through the California Academy of Sciences in 1951 (see *PD,* September-October 1952, p. 15); fishes and reptiles collected were deposited at the Academy. . . . ¶**George W. Bunton,** manager and lecturer, Morrison Planetarium, makes no secret of his addiction to science fiction, but we assure you he can be trusted as a source of fact on the podium and in print.

D.G.K.

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THE COVER

The young Mayan lady of Yucatán exhibits a charming local fashion which calls attention to her slip showing. Photograph by Lloyd Glenn Ingles who appears to have a good eye for native customs on his travels.

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EDITORIAL

BENJAMIN FRANKLIN & THE MODERN MIND

JANUARY 17, 1956, marks the 250th anniversary of the birth of Benjamin Franklin. This affords a suitable occasion for a reappraisal of an American whose stature grows steadily with the passage of time.

Of the Founding Fathers, Franklin was the oldest, the most learned, the most experienced, the most worldly-wise, the most good-humored, the most tolerant of opposing views, and yet the most direct and incisive. When Jefferson, drafting the Declaration of Independence, wrote "We hold these truths to be sacred and undeniable," Franklin changed it to read "We hold these truths to be self-evident" – a statement that has gone ringing down the corridors of time. Franklin made only a few alterations in Jefferson's text, but every one strengthened the impact of the document. Long before "semantics" was born, here was a man who had studied how to use words to convey precise meaning.



Franklin was also, of the Founding Fathers, not only the most cosmopolitan, but the most typically American. There was in him something of Socrates, Leonardo, Samuel Johnson, Eli Whitney, Abraham Lincoln, Joseph Pulitzer, John Dewey, Henry Ford, and Will Rogers. He was, in contrast to Washington, Adams and Jefferson, who were aristocrats to the manner born, a man of the people. The son of a tallow-chandler, he started to make his own way in the world while still in his teens. He supplied the prototype of the American success story – from rags to riches. He was not only successful, but successful to the degree that by the time he was forty-two years old, he was able to retire from business and devote the remainder of his long life to scholarly pursuits and public service.

The story is well-known how Franklin, chafing under an apprenticeship to his brother James in Boston, ran away at the age of seventeen, arrived in Philadelphia almost penniless, and made his living there and subsequently for three years in England, at the time-honored calling of journeyman printer. Returning to Philadelphia before he was twenty-one, he engaged in various enterprises (including clerking in a store), and presently founded the *Philadelphia Gazette,* which he speedily built into the largest and most influential newspaper in America. Later he obtained an interest in the *New York Gazette* and the *Connecticut Gazette,* thus becoming the first chain newspaper publisher.

His most successful venture financially was the publication of *Poor Richard's Almanac,* an annual volume the popularity of which was due to a variety of pithy sayings: God helps them that help themselves; Plough deep while sluggards sleep; Three removes are as bad as a fire; He that goes a borrowing goes a sorrowing; Early to bed and early to rise, Makes a man healthy, wealthy, and wise. It must have given Franklin, with his strong sense of humor, considerable inner amusement to contemplate that the publication of his aphorisms concerning hard work and thrift had, by the time of his early middle life, placed him beyond the need of thinking about either. But early habit was strong: he never became a sluggard nor a spendthrift, though he did allow himself, and knew how to enjoy, the comforts wealth could provide.

Franklin was also, in a favorite though nearly past American tradition, self-educated. With only two years of formal schooling, he became one of the most learned men of his time. Before he had reached his fifty-sixth birthday, he had been awarded an honorary degree of Master of Arts by Yale, Harvard, and the College of William and Mary, an LL.D. by St. Andrews University, and the degree of Doctor of Civil Laws by Oxford. He had also been awarded the Copley medal of the Royal Society of London, and been elected to membership in that select organization. He had already founded the American Philosophical Society, and an academy which grew into the University of Pennsylvania.

Someone recently remarked, "It was easier to be a universal genius in Franklin's day than it is now, because there was not so much to be known." But one must remember that, with no large body of scientific knowledge to draw on, it was a great deal easier to be wrong. Franklin's genius lay in the fact that, with so little to go on, he so often came up with the right answers.

Carl Van Doren has written, "Franklin had, I think, the most eminent mind that has ever existed in America." The late Robert A. Millikan rated Franklin with Copernicus, Galileo, Newton, and La Place in his influence on scientific thought, and expressed himself as "amazed by the fact that Franklin without any previous training whatever in either the technique or the history of physics and with almost no contact with what others were doing or had done, within two years of the time of his first experiment had acquired a keener insight into the fundamental nature of electrical phenomena, not merely than anyone had acquired

up to his time, but even than any of his successors acquired for the next hundred and fifty years, when, about 1900, the scientific world returned essentially to Franklin's views."

Remarkable as this achievement may seem, it is understandable in the light of Franklin's habit of mind, which was essentially and intuitively scientific. He proceeded on the assumption that for every question there is a reasonable answer, and that to every problem there is a discoverable solution. His mind was continually active, probing, searching, reflecting, forming hypotheses and testing them by experiment. Sometimes the experiments failed. He observed luminescence in the sea, and thought it might be an electrical phenomenon due to friction between the salt and the water. So he took a bottle of sea water and shook it up. At first it would glow, but after a few hours no amount of shaking would restore the luminescence; so he abandoned the hypothesis. This is just as characteristic of his habit of mind as other experiments which succeeded, and indicates why he was so seldom wrong.

No project was too large for him, and none too small. On his numerous voyages across the Atlantic he studied and mapped the Gulf Stream; but on one voyage when it was too rough to be on deck, he emerged from his cabin after a few days with a paper on how to correct smoking chimneys. The combination chair and stepladder which Franklin devised for his library is in use in most kitchens today, and the gadget he invented for getting books from the top shelf is still in use by grocery clerks for getting down packages that are too high to reach. When he was seventy-eight he invented bifocals for the simple reason that he didn't want to be bothered with two pairs of glasses. "Finding this change troublesome . . . I had the glasses cut and half of each kind associated in the same circle."

Franklin was as modern as tomorrow. In his old age he expressed the wish that he might have been born later, so that he might see the wonders that "true science" would produce. But the world is fortunate that he was born when and where he was.

R.C.M.

ALPHABETS, BOOKS, AND CIVILIZATION

I, BENJAMIN FRANKLIN, of Philadelphia, Printer, late Minister Plenipotentiary from the United States of America to the Court of France," etc. So began Franklin's will, according to the eminent printer-biographer John Clyde Oswald.* *PD's* managing editor, a scientist, spoke above of science's debt to Franklin. Proudly your editor, a printer too, points to Ben Franklin as "patron saint" of his trade – Franklin, along with the Alduses, Estiennes, Plantins, and other great editor-printer-publishers raised it to the dignity of profession – reëmphasizing Franklin's lifelong regard of himself as first of all a printer.

"The famous epitaph was written when the author was twenty-two," Oswald says, "but was never used," unhappily:–

THE BODY
OF
BENJAMIN FRANKLIN
PRINTER
(LIKE THE COVER OF AN OLD BOOK,
ITS CONTENTS TORN OUT,
AND STRIPT OF ITS LETTERING AND GILDING,)
LIES HERE, FOOD FOR WORMS.
BUT THE WORK SHALL NOT BE LOST,
FOR IT WILL (AS HE BELIEVED) APPEAR ONCE MORE,
IN A NEW AND MORE ELEGANT EDITION
REVISED AND CORRECTED
BY
THE AUTHOR

*Benjamin Franklin, Printer, (New York), 1917.

There is seemingly no end to Franklin's attributes and hence to the branches of human endeavor claiming some part of this prodigious man in annual eulogy (sports editors note: Oswald observes that while in London as journeyman printer Franklin gave aquatic exhibitions – "he was an expert swimmer, and so far as is known, he was America's first athlete"). A point of departure for some thoughts hereinafter is Franklin's sometime concern with the ultimate, indivisible elements of the printer's craft – type – and of the printer's art – the alphabet. It is perhaps well known that Franklin was typefounder as well as printer; not surprising, if not well known, are his experiments with alphabet reform, and his studies of language itself.

Thought, speech, writing: one, two, three – steps to civilization. Ideas, their direct communication, their spatial transmission and preservation for future reference – short outline of history. Apes are speechless, but are known to think. Man alone took the next step (mere vocal communication aside), to true speech. Step three (agriculture aside) marked man's turning toward what we are pleased to call civilization. Writing began, we may be sure, very long before the dawn of recorded history. The calligrapher Oscar Ogg has sketched* a piece of paleolithic reindeer horn – oddly pistol-shaped – with carefully spaced nicks cut in it (perfect prototype of the six-gun notches by which early Westerners recorded the demise of another redskin or gambling adversary). It may just "have been a

*The 26 Letters. Crowell, New York, 1948.

kind of calendar," Ogg observes. "No one knows . . . but it did have some *practical* use"—it was a *record.*

Picture-writing, familiar to every schoolboy, is generally associated with primitive man, from cave-dweller to American Indian; it is cited as basis of Chinese ideographs and component of Egyptian hieroglyphs; and it is used by contemporary advertising wheels to generate spending ideas in the modern mind. This direct, graphic means of recording and imparting information tooled man up for progress. Civilization still marches on with picture-writing.

But the invention that really jumped us into high gear was the alphabet. The Chinese and other peoples in history, to be sure, reached their flowering without it, but in many directions their cultures ceased, for better or worse, to advance. (Looking around us, here in the modern West, at paper-back novels, time-tables, income-tax forms, automobile ads, and atomic weapons statistics, we may get a queasy feeling we've been had — the present essay is not a paean to letters but merely a glance at history.) If modern scientific and technological civilization is indeed where it is, in part, at least, by virtue of a simple, easily learned device for the preservation and unlimited transmission of our entire body of culture — fact, inspiration, thought — as well as a universal and long-since indispensable medium for the conduct of daily affairs, then the study of the alphabet and how we got it is more than worth while. It is necessary, and utterly fascinating.

One may begin with Oscar Ogg's clear and simple book with its lively but authentic illustrations in two colors, in the teens if possible but at any time if subject and interest are new. Equally recommendable is *The Triumph of the Alphabet* by Alfred C. Moorhouse of the University of Wales. This is a mature and scholarly account for the general reader, taking him from historical background (with intriguing glimpses into the detective story of ancient script decipherment) to philosophical considerations of the functioning and historical influence of writing and its relation to the spread of literacy. Teachers and writers, especially, should find this book invaluable.

For the ultimate in full-dress monographic treatment by an acknowledged authority, we must turn to David Diringer. The recent new edition of his one-volume encyclopedia of the world's systems of writing, *The Alphabet* (first published 1948), supersedes all previous works in its field by virtue of its completeness and its incorporation of the latest achievements of scholarship. If Ogg and Moorhouse whet you for a deeper cut into the matter, and you must go to "the chief work now available" (Moorhouse), this is it.

Between the alphabet and civilization stands — the book. Between every book and its readers stands a scribe or printer. A little thinking about the book as vehicle of our heritage *prior to* the invention of printing must bring one to something like awe before the individuals to whom we owe the survival of our greatest treasures. Surely the scribe earned the respected, often privileged place he held in various times. Consider that in pre-alphabet cultures he had to master hundreds, even thousands of graphic signs and frequently render them from dictation. Think of the bulky, awkward clay tablet and laborious cuneiform of ancient Sumer and Babylon; of papyrus (what an advance!) and the elaborate hieroglyphics of Egypt; of patient monks cloistered in the scriptoria of Europe's Dark Ages — on the handful of them hung the slender thread of recorded history, the handing on (literally *by hand*) to us of ancient knowledge and wisdom, and the stuff of everyday life.

Again, for the full-round, world-wide picture we are beholden to David Diringer: *The Hand-Produced Book* is worthy companion-volume to *The Alphabet.* It would be unfair not to mention here that Dr. Diringer strongly emphasizes our debt to religious institutions, particularly through the Middle Ages, as guardians and transmitters of our Western heritage.

We turn to the printed book. For a generation the Bible of students of printing has been *Printing Types, Their History, Forms, and Use* by the American scholar-printer Daniel Berkeley Updike (Harvard University Press, Cambridge, 1922 and 1937). A popularly-written survey is now provided with Frank Denman's *The Shaping of Our Alphabet: A Study of Changing Type Styles,* in which the author has linked letter-forms with history and culture from period to period. This handsome, readable book is replete with well reproduced examples of types and book pages through the centuries and leads to some challenging thoughts on the need for continuing revision of letter forms.

Change is as vital as it is continuous, but it should be guided by knowledge and appraisal of tradition. One of the great periods of printing and the book arose within the century after Gutenberg. It can be understood and typified through one of its towering figures, Robert Estienne. The recent biography of France's 16th-century "Royal Printer" by the Oxford scholar Elizabeth Armstrong is also an intensive study of book publishing and the printing-house world two centuries before Franklin. It was big business, so soon after Gutenberg, but fortunately often in the hands of scholar-craftsmen like those of the Estienne dynasty who saw and discharged, even at personal risk, the obligations of the press to freedom and truth. Franklin was their worthy successor in his time.

Franklin's ties with France were strong. In the eight years at Passy he set up a press; he designed a type for Fournier. At his death, Oswald says, French printers met in memorial. A bust was mounted with cases, press, and all beneath. As the speech progressed, it was set in type; proofs were pulled for all present. He was a printer's printer in any language. D.G.K.

NOTE: For review data on books mentioned turn to p. 32.



MEAT FOR MAYAN TABLES

LLOYD GLENN INGLES *PHOTOGRAPHS BY THE AUTHOR*

DON'T MAYANS ever eat meat? The question was asked by a tourist who, with a group of others, had been listening to a native guide extol the achievements of his ancient ancestors. For more than an hour the guide had been talking to his interested followers waiting for the rain to stop before they left El Caracol, one of the famous ruins at Chichén-Itzá. I was not one of the tourist group, but when the question was asked I moved closer to hear the answer the educated young Mayan would give, because this question was related closely to a larger one concerning mammals that had occupied most of my time since I had arrived on the Yucatán Peninsula a few weeks earlier. The guide assured the tourist that his countrymen *did* eat meat, but he failed to add that the diet of the average Mayan was nevertheless only about one sixth of a pound of protein per day, which by our standards is very deficient indeed. He also failed to say which animals were used for food or how they were obtained.

Every schoolboy, of course, knows that many of our most valuable plants originated in Mexico and Central America. Not every educated layman, however, would associate with the ancient Mayan civilization the development of such familiar plants as corn, beans, tomatoes, squashes, pumpkins, papayas, and oranges – there are still others which make for better eating in our time, which these superb farmers developed long ago and which are now used by the whole world. What would life be like without such plants as cotton, henequen, chilipepper, vanilla, allspice, or the milk of sapodilla for our chewing gum!

A giant rattlesnake winds and twists all over the front of one of the buildings in the famous ruins at Uxmal, Yucatán. Only the decorated head and rattles are shown here.

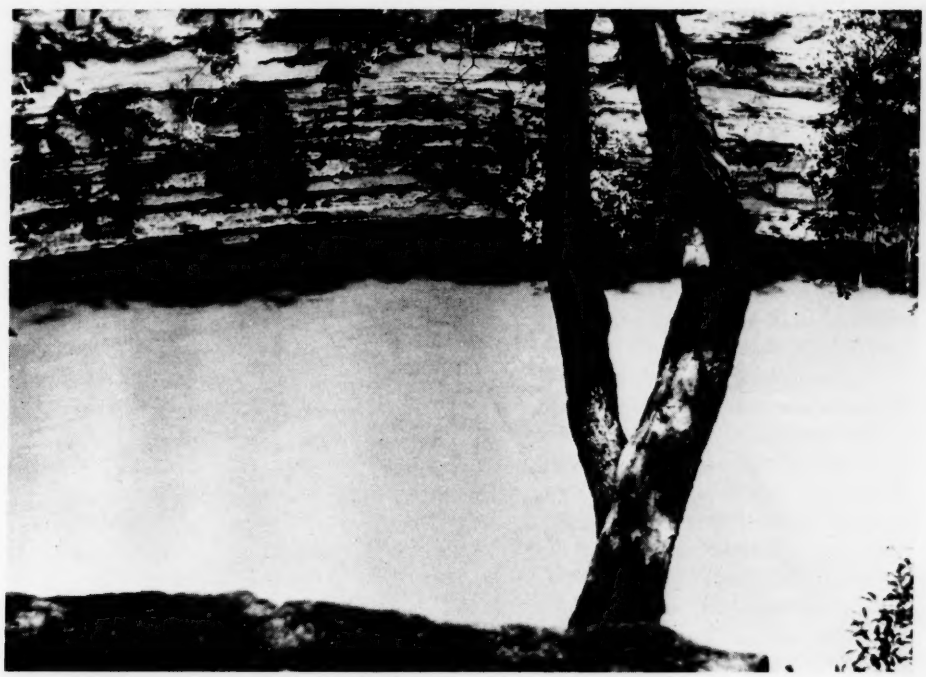
All of these plants were cultivated about the *cenotes,* or open wells, 1,000 to 1,500 years ago, as indeed they still are grown in the *milpas* of Yucatán, Campeche, and Quintana Roo.

Much has been written and said about the plants the Mayans developed, but scarcely anything is known about the animals they also used. One might hastily and erroneously conclude that these people lived by plants alone.

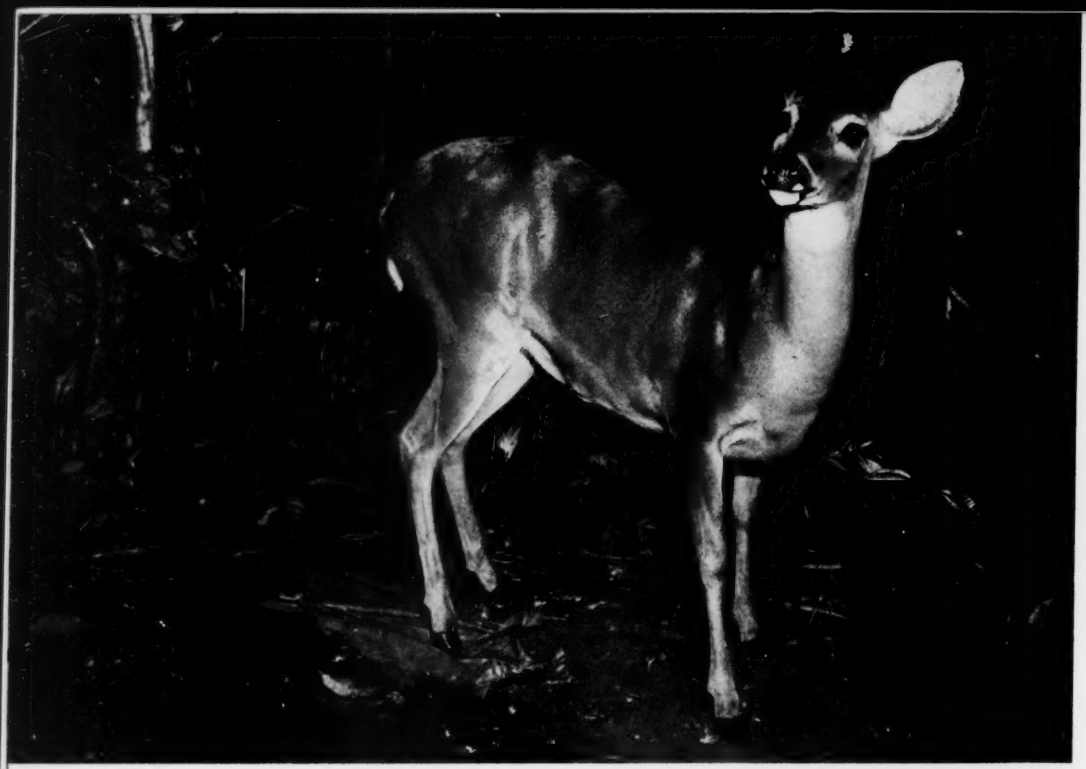
Hence the tourist's question was pertinent and might well have been asked by anyone but an anthropologist. Did these ancient people who built the imposing edifices with their corbeled vaults decorated with striking art work, at Chichén-Itzá, Uxmal, and Tikal, do so on a 2,500-calorie diet, mostly of corn and beans? The present-day hard-working Mayan on the henequen plantations uses about that many calories. Our workers need about 3,500 calories for similar hard work. Did these people who charted the cycles of the sun, moon, and other heavenly bodies at El Caracol, and whose concepts in figures included zero, make those astounding discoveries on a similar protein-deficient diet?

Perhaps we shall never have answers to these questions, but in order to guess about them more accurately I began gathering such information as seemed pertinent on the uses the ancestors of present-day Mayans made of native animals before Europeans came with chickens, pigs, cows, horses, sheep, and goats. Very little seems to have been written about the Mayans' use of animals, and so it seemed I would accomplish most by going directly to the Mayans themselves.

For two summers I went to the Mayans – in 1954 to the Chiapas-Guatemalan highlands; in 1955, to the states of the Yucatán Peninsula. It soon was obvious I faced one great handicap – the Mayan language. In the average pueblo three out of four people could speak only Mayan, and there are pueblos in Quintana Roo where not a single person could be found who could or would speak Spanish. Authorities assert that over the 400 years that Spanish and Mayan have been associated it is the Spanish that has changed, not the Mayan. It wasn't long, however, before I had learned the words for deer *(keh),* peccary *(kitam),* tapir *(tsimin k'a'ax),* rabbit *(t'ul),* curassow *(k'ambul),* wild turkey *(ulum),* paca *(tsub)* and the Mayans noticeably became more interested in me and my work. The most valuable help, however, came from two men: Sr. Juan Lopez who could speak Spanish as well as his native Mayan tongue, and Sr. Jackie Vasquez, who could speak Mayan, Spanish, and



Cenotes such as this one provide the only source of water, especially during the dry season, not only for the Mayans, but for the wildlife as well. Because animals tend to congregate about them, the cenotes are favorite Mayan hunting and trapping places.



← The white-tailed deer is the most important source of protein food for Mayans. It also does considerable damage to his corn and beans in the milpas.

↓ One of the choice food animals, the paca is a rodent as large as or larger than a house cat. It is avidly hunted at night with dogs and jack lights.

English. Juan lived in Chochola, Yucatán, and Jackie in Belize, British Honduras. I visited the homes of these men and found them both exceedingly well versed in the fauna of their local forests.

I was very much surprised to find that the Mayans had names even for the smaller species of animals, such as the bats, rats, mice, and even many insects. This application of a specific name for each kind of animal speaks very well indeed for the quality of observation of a non-literate people. One cannot apply a specific name to a kind of animal unless he observes that it has distinguishing characteristics separating it from other similar animals. I know of no other Indians that make such close distinctions.

When Juan Lopez invited me to his village, I readily accepted and not only learned much about the local fauna and its use by his people, but also much about the Mayans themselves.

He said that deer constituted by far the most important meat source from the forest. Near Chochola there are two species of deer, the white-tailed deer and the Yucatán brocket, both of which are regularly sold in the native markets. He said there are two ways to get deer. One method, used extensively during the rutting season, is to use a wooden whistle which imitates the voice or snort of the animals. With it they can be lured close enough to be shot or lassoed. Another method widely used at all times of the year is to build an



elevated platform 8-12 feet high over the place where a large log has recently been completely burned at the edge of the milpa. After the deer have become used to the structure they visit the spot nightly in order to lick the salty ashes and thus come within easy range of the hunter who frequently remains crouched uncomfortably on the blind for many hours before he is rewarded with the chance to get a *keh*. Near Chochola the banded peccary is the second most important source of wild meat. Apparently the best way to shoot a *kitam* is to hide near a wild fig or nut tree and wait until the prey comes within range. Smaller ani-



Frequently sought for food, brockets live both in deep woods and on the savanna.

mals such as the cottontail and forest rabbits, the agoutis, and the paca, are hunted with a gun at night while using a light or torch to shine the eyes. These animals are also captured by means of snares set along favorite runways in the forests and at the edges of the milpas. The snare is constructed by tying a piece of strong henequen cord to the top of a young elastic sapling which has been trimmed of its branches. A lasso loop is made at the other end of the cord. A stick is tied in the cord near the top of the sapling. When the little tree is bent over, this stick is fastened under a notch of a strong stake from which it can easily be released by means of a delicate trigger that lies across the trail. The loop is arranged in such a way that an animal advancing down the path sticks its head into it just before stepping on the trigger. This releases the sapling which springs back to its normal position suspending the animal by its neck. Animals as large as jaguars and pumas are occasionally captured by this kind of snare. The Yucatán and Deppi squirrels are hunted with a gun, but also are trapped, as various kinds of doves, pigeons, and quail are, by means of woven wooden boxes set with baits of corn in the milpas. The trigger for this trap is very similar to the familiar figure-four box trap. Although Juan assured me that the large hispid pocket gopher was frequently captured and eaten, neither he nor anyone else seemed to be familiar with the dead-fall type of trap which the Indians in the mountains around Mexico City use so effectively to capture the Merriam pocket gopher. Neither could I find any *tuceros* whose job it is to rid the milpas of these fossorial pests, whereas in the mountains in Central Mexico nearly every pueblo has its special "gopher catcher."*



The ocelated turkey *(Agriocharis ocellata)* which is found only on the Yucatán Peninsula, and the great curassow *(Crox rubra)* are hunted in the deep forests but frequently come to the edges of the milpas for food. The best time to hunt all kinds of animals is during the dry season when they gather about the cenotes to drink. There is little or no other surface water during the dry season in the northern part of the Peninsula. The eggs and flesh of various turtles, tortoises, and iguanas are avidly eaten, and even the boa and large tropical rattlesnakes are occasionally used for food.

As soon as the pueblo learned I was interested in getting live wild animals and would pay real pesos for the opportunity to examine and to photograph them, all sorts of creatures began to appear. One evening an armadillo and an iguana with their feet tied to a stick were offered to me before they were prepared for the meat pot. A young

*See the author's article, "Life in the Zacatón," *PD* January-February 1955, pp. 4-10.—Ed.

Second most important source of meat for the Mayans, the collared peccary is most often killed under wild fruit trees in the forest.

pisote or coatimundi was purchased which apparently was also intended as a protein supplement to the tortillas and beans.

One night an excited lad burst into Juan's patio and told him something in the most explosive Mayan I had ever heard. Juan asked him a few questions and bade me get my cameras and go with them to a thatched hut where two Yucatán squirrels had made a nest among the thatching and were at that moment playing about on the timbers supporting the roof. When we arrived the squirrels were still cavorting about in the semi-darkness, with only the glow of a charcoal fire in one end of the hut's single room. The camera and stroblite were soon in operation, and I actually took several shots of these beautiful squirrels as they gamboled about above my head, much to the delight of the excited Mayans who kept coming to see the show until there was scarcely standing room in the tiny hut. As I left I took a picture of only a part of the crowd in the doorway.



A few days later Jackie Vasquez corroborated everything Juan had said about the animals of the Peninsula. He even invited me to go on a hunt for manatee which are protected in British Honduras but are nevertheless hunted and actually sold occasionally in the native market at Belize. These large aquatic mammals feed on a grass-like plant which grows in the shallow deltas of the rivers. They browse on these shallow-water plants, using their thick, hairy lips to bring the food into the mouth in a way that suggests the feeding of a giant caterpillar. At night when a herd of manatees is feeding in a quiet estuary, the noises the animals make can be heard for a distance of two or three hundred yards. Then they may be approached by a couple of hunters in a *cayuco* or dugout canoe. One hunter paddles the cayuco

↑ A young pisote (coatimundi) about to trip a snare in southern Yucatán. Henequen snares of this type are used to trap animals even as large as the jaguar.

→ Iguanas are very common, among the ruins especially, and are an important source of food.





while the other stands in the prow armed with a harpoon tied to the craft by a stout henequen rope. When an animal is harpooned there follows a wild chase as the frail cayuco and its passengers are towed about at terrifying speeds until the sea cow tires and can be safely towed to the beach. A sudden squall spoiled our hunt, and we felt lucky to get home alive even without a manatee.

The tapir is the largest animal on the Peninsula and is readily caught and eaten where it occurs, although in most parts of the Peninsula it is rare or difficult to kill or trap. Around Bonampak (Chiapas), however, its tracks are very numerous, but whether it is used as food by the dwindling tribe of Lacondons that live there I do not know.

Jackie Vasquez acts as a guide for persons wishing to go into the bush, but his main source of livelihood is the sale of wild orchids which he and his men gather from the forest. He employs chicheros who not infrequently have to climb a hundred feet or more to obtain some rare epiphyte. There is a ready market in the United States for all he can collect. This contact with the forest has given Jackie an intimate acquaintance with every creature large and small that lives in the bush.

It was Jackie, I think, who gave me most of the information about the bees of the Peninsula. The ancient Mayans long ago captured and kept in thatched hives two species of stingless bees *(Melipona beecheii* and *Melipona fulvipes)* which even today furnish nearly all of the honey and wax the natives use. These bees are as domesticated as bees ever become, and when a man wants to start a hive of them he goes to a neighbor, not to the woods, to get his swarm. There are, however, at least five other species of wild bees that live in the forest from which honey and wax are still obtained. All but one of these are stingless; one makes a mud nest on the branches of a tree. Each species of bee has its own special Mayan name. Honey was perhaps the best, if not the only, source of sugar of the ancient people.

The tapir is the largest wild animal in Mexico and Central America. Rare in most places and difficult to hunt, it is not important in the diet of most modern Mayans.



↑ The Yucatán squirrel is often shot or snared for food. Sometimes they gambol about the thatched roofs of native houses when they are not molested.

→ Parrot-like birds ranging in size from this large red macaw down to small paroquetes are kept as pets but may be eaten on occasion, as many other birds are.



The Mayans are the only Indians of Mexico and Central America I have found that can readily distinguish between vampire bats and other large tail-less chiropterans. One evening I was conducted into a cave near Chochola where I soon saw several large bats fluttering and flying about in the beam of my flashlight. My first impression was that they were vampires, but my Mayan companions assured me they were not. I shot three of them, and all proved to be a large species of fruit-eating bat common not only on the Peninsula but in other parts of Mexico as well. Once in Mazatlán, Sinaloa, I was assured by a group of natives that this *same bat* was a real *vampiro!* When we came out of the cave with our specimens one of the bats was still alive but quite unable to fly. Fully fifty people had gathered to watch me make the strobe-light exposures to show the peculiar features. After

I had finished I tried to kill the wounded bat by stepping on it, but a loud protest arose from at least a half dozen young men who immediately stepped forward to rescue it. There was no objection, however, when I picked the wounded creature up and put it in the knapsack to die. Neither was there any objection to my shooting the bats in the first place. I was never able to understand Juan Lopez when he tried to explain this behavior of his friends and neighbors.

It has long been known that the Mayans have many superstitions about animals, especially the hunting of them. Likewise it is not surprising that some animals (as well as parts of them) are believed to have medicinal properties. For example, one day while I was photographing a round-tailed porcupine *(Coendou mexicanus)* my Mayan companion advised me that the spines of this animal



➔ A spider monkey in the forest of western Campeche. Although monkeys are frequently kept as pets by Mayans they are sometimes eaten.

↓ Some of the interested onlookers that watched the author photograph the Yucatán squirrels on the roof.



were the best known cure for headaches. I inquired about the proper means of using the spines in such an illness and was informed that one or more spines, depending on the severity of the case, were simply run through the skin of the head until the point reached the skull. Here they were to be left until the pain disappeared! The boy collected a couple of dozen loose spines for future use and advised me to supply myself with some as well. I declined, explaining that I never had headaches and that I was actually afraid to carry such medicine in my pockets. Perhaps some such medicinal use is the explanation for the hundred or more skeletons of the least short-tailed shrew *(Cryptotis micrura)* that were found in a large vase in the ancient ruins at Uaxactun, Guatemala. (Perhaps also the shrews merely fell into the vase and could not escape.) That the ancient people had great respect and feeling for certain of their animals is clearly shown by their ceremonial art in and on the walls of their magnificent buildings. Anyone who has seen the emerald-studded red jaguar at Chichén-Itzá or the great rattlesnake at Uxmal is certain to be impressed with these fine representations in stone.

With all their centuries of close association with animals the Mayans failed, nevertheless, to develop a large domestic animal that could be a constant source of protein, such as the reindeer, and a beast of burden such as the llama of the Andes. This may be partly because there was no suitable wild stock available for either. It is my opinion, however, that it is partly a result of the Mayan conservatism. Even after the oxen, burro, and horse were introduced and had long been widely accepted in other parts of Mexico, the present-day Mayan still carries his own heavy burdens or hires human porters as he comes to and goes from the markets at Sololá (Guatemala) or Valladolid (Yucatán). He still burns the forest and plants his corn with sticks just about as his ancestors did 1,000 years ago. He still depends on hunting and trapping wild forest animals for a considerable part of his meat because such chickens, turkeys, and pigs as he has are a very poor stock. Might their advance and their culture have been even greater had these interesting people had a beast of burden when they made their great buildings? Might not history have been different also, had they had a good protein diet when the Toltecs came to overwhelm them? Of these things we shall always wonder but never know.

JOAN PARRY

WHO FIRST F

THE AMATEUR BOTANIST who comes to the West Coast will, sooner or later, question the origin of plant names. He will understand such descriptive terms as *occidentalis* and *californica,* but others may arouse his curiosity — *menziesii, douglasii, scouleri, jeffreyi, Tolmiea, coulteri, lewisii, Clarkia, Fremontia.* Who were these people?

There will be a day when he stands to stare in wonder at the madroño, repeating the name *Arbutus menziesii:* when he stoops to see the lip markings on an iris and know it for *Iris douglasii.* Then he will want to know who first found these western flowers: by whom and for whom they were named.

It was Captain James Cook's third voyage that attracted world attention to the North Pacific Coast.



COMMON ASTER—*Aster Chamissonis.*

ST FOUND THESE WESTERN FLOWERS?

Spain, England, Russia, France and America from that time on sent out expedition after expedition to chart the coast, trade in furs, stake territorial claims, and seek a navigable passage between the North Pacific and Atlantic oceans. And early botanical exploration in the West, which reached its height during the first half of the 19th century, developed as part of this world movement to the Pacific Northwest.

It is not possible to write here in detail of all the early plant collectors, but since Britain contributed most to botanical discovery at that time, emphasis is given to the work of British botanists. They cannot, however, stand outside their context, and cursory reference is made to their contemporaries and those that came immediately before and after them.

There were, besides the pioneer plant explorers, some essential collaborators – the systematic botanists who completed the work of the plant collectors by identifying, classifying, and naming the specimens brought in from the field. Many of these men were collectors themselves. Among the great names are the Americans, Asa Gray (1810–1888) and John Torrey (1796–1873), both of whom collected in California, and Frederick Pursh (1774–1820); and the English father and son, Sir William Jackson Hooker (1785–1865), and Sir Joseph Dalton Hooker (1817–1911) who accompanied Asa Gray on a botanizing trip to the Rockies and California in the summer of 1877.*

The Spaniards were the first in the field. Long before Drake claimed New Albion Spanish explorers noted and named certain plants: it is generally accepted that Columbus took home seeds of "maize" when he returned to Spain in 1492. The French, hard on the heels of Captain Cook, made noteworthy finds. Collignon, gardener-botanist on the La Pérouse Expedition, took back to Paris seed of the rose-colored sand verbena that he collected at Monterey in September 1786; to him goes the honor of introducing the first California plant to flower in Europe.

Then came the Scottish surgeon-botanist Archibald Menzies, the first serious plant collector on the Pacific Coast, whom the Indians remembered as "the red-faced man who cut off the limbs of men and gathered grass." He served first as naval surgeon in Nova Scotia, then on Captain Colnett's three-year voyage of exploration, when in 1787 he collected on the shores of Nootka Sound and there first found the flowering currant *Ribes sanguineum* and other plants named after the place – *Rosa nutkana* and the raspberry *Rubus nutkanus.*

On his return to England Menzies secured, through Sir Joseph Banks, the post of full-time naturalist on Captain Vancouver's famous five-year voyage in the *Discovery.* Vancouver's comment on the appointment was terse; he resented, perhaps, the extraordinary measures taken to assist the botanist – the erection of a glazed frame on the after part of the quarter-deck for "the purpose of preserving such new or uncommon plants" as Menzies might collect.

The *Discovery* reached the Puget Sound area in 1792 and the first plant which attracted Menzies' attention when he landed at Port Discovery on May 1



CALIFORNIA POPPY—*Eschscholtzia Californica.*

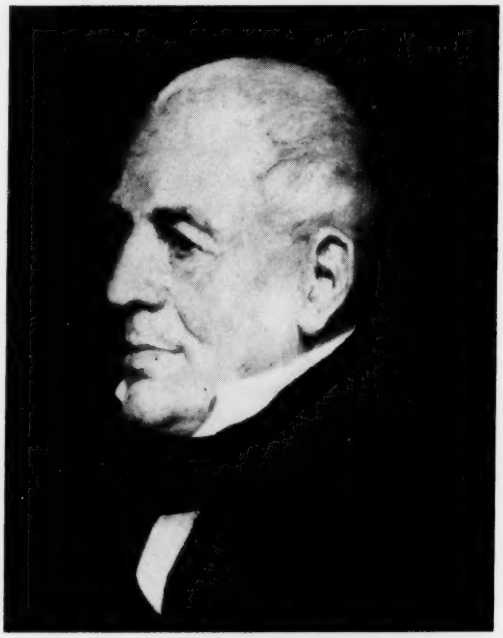
*An excellent photograph of the Gray-Hooker party in camp in the Rockies with F. V. Hayden appeared in *Pacific Discovery,* May-June 1951 (see "Tea-Time in the Rockies" by Benjamin Draper, pp. 28–29).

was the wild valerian growing behind the beaches in large thick patches.

The "great flowering dogwood" and that "peculiar ornament to the Forest" the Oriental Strawberry Tree, as he called the madroño, were in flower. Its smooth reddish-colored bark, he declared, "will at all times attract the notice of the most superficial observer."

For three successive years the *Discovery* sheltered for the winter in the Sandwich Islands, sailing northward in the spring and summer, passing south again in the Fall. Bodega, San Francisco Bay, Santa Clara, and Monterey were all known to Menzies as well as several places along the coast southward from Santa Cruz.

Vancouver was apparently not impressed with Menzies' finds. After listing in his journal certain plants which he himself had noted, he remarked that "Amongst the more minute productions, Mr. Menzies found constant amusement; and, I believe, was enabled to make some addition to the catalogue of plants."



Archibald Menzies, from the portrait in the Herbarium, University of California, Berkeley. (Courtesy Dr. Herbert L. Mason, Director)

➔ David Douglas, drawing by his niece, Miss Atkinson, 1829. (In *Douglas of the Fir*, by A. G. Harvey, Cambridge, 1947. Original in Royal Horticultural Society, London)



FLOWERING CURRANT—*Ribes glutinosum.*

Botanists who later checked Vancouver's "addition" credited Menzies with three hundred species from the Northwest alone. Among the more "minute productions" he was the first to collect many trees, including the coast redwood which he found at Santa Cruz, the grand fir, *Abies grandis*, and the California laurel, *Umbellularia californica*, which Oregon claims for its own under the name Oregon myrtle though Menzies discovered it along the shores of San Francisco Bay.

Other "additions" include the fuchsia-flowered gooseberry, the salmon-berry and the yellow bush lupine, Menzies' penstemon and other plants that bear his name.

On his return to England Menzies forgot that as a naval man he should turn over his collections to the Secretary of State. Consequently it was sixty years before the Government described and published his material. Thus many of Menzies' plant discoveries were credited to other men, and often named by or for them. The Pacific dogwood is one of these — that is another story.

But the American botanist Frederick Pursh gave him his due. Over a hundred years after Menzies found his "Oriental Strawberry Tree" Pursh named it scien-

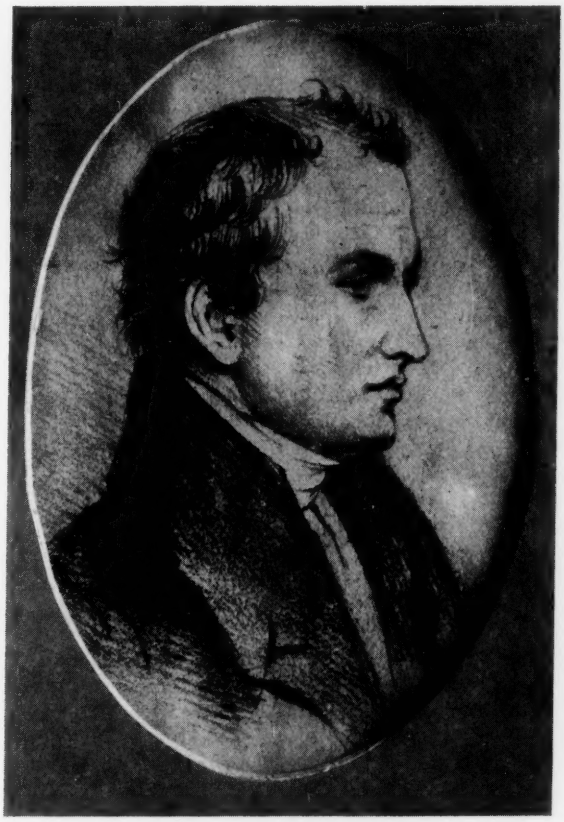
The wildflower drawings by Margaret Warriner Buck are from the new edition of *The Wild Flowers of California* by Mary Elizabeth Parsons, California Academy of Sciences, San Francisco, 1955.

tifically *Arbutus menziesii,* and it is by this, by one of the world's most beautiful ornamental trees, that he is best and most proudly remembered.

Scientific investigation was a secondary object of the American overland expedition (1804–1806) led by the two soldiers, Captains Meriwether Lewis and William Clark. They took no Menzies, no botanist along, but were under President Jefferson's orders to botanize as best they could. They brought back a great collection. For Lewis, the more botanically-minded of the two, the bitter-root, the blue flax, and the western mock orange (*Philadelphus lewisii*) are named; for William Clark, the genus of the low-growing annual *Clarkia pulchella* (*pulchella,* the beautiful).

It was now the Russians' turn. The expedition sent out in 1815 under Captain Otto von Kotzebue is of special California interest. Plants named by them or named by others from their collections include the California lilac, *Ceanothus thyrsiflorus;* the blue bush lupine, *Lupinus chamissonis,* and the California sage, *Artemesia californica.*

Johann Friedrich Eschscholtz, a naturalist especially interested in entomology, and Adelbert von Chamisso, botanist and poet of French parentage raised in Germany, accompanied the expedition. Among other plants they took special note of the yerba buena, which the Spanish colonists knew well as a "good herb"; and





BABY-BLUE-EYES—*Nemophila insignis.*

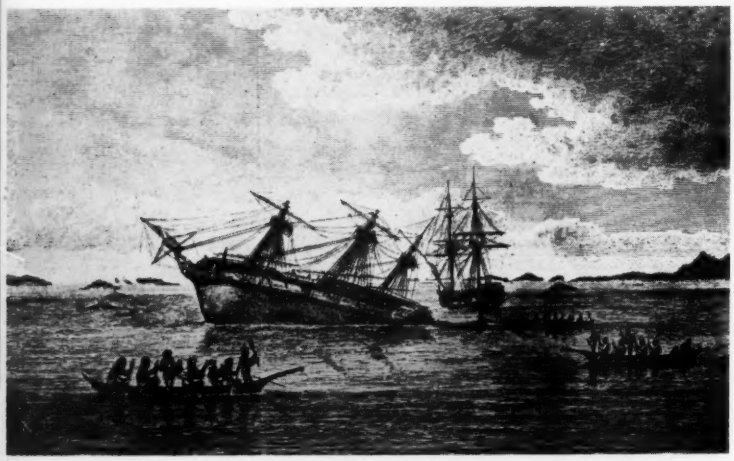


ALPINE PHLOX—*Phlox Douglasii.*

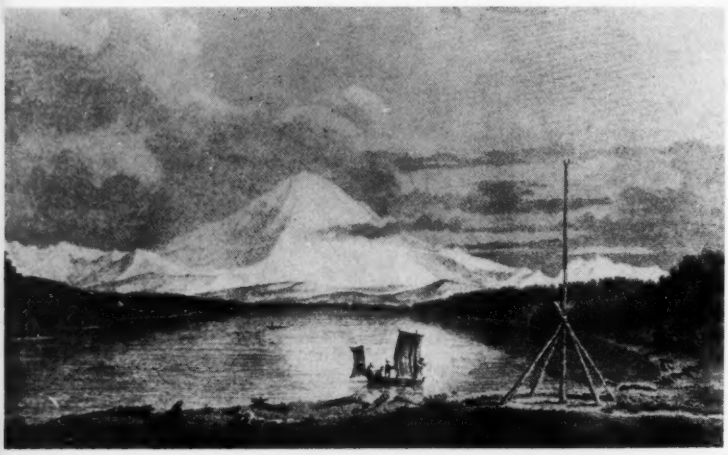
of the flame-gold poppy which became California's state flower despite its unhappy name *Eschscholtzia californica.*

Our Northwest coast presented a wilderness front to the first plant explorers.

David Douglas, coming a generation after Menzies, was his botanical successor. Through the recommendation of Dr. William J. Hooker he was employed in 1823 by the London Horticultural Society as plant explorer to North America, and first spent six months in the eastern United States investigating the latest methods of fruit growing.



H.M.S. *Discovery* on the rocks in Queen Charlotte Sound. Believed to be the only available print of Vancouver's *Discovery*. (Provincial Archives, Victoria, B.C.)



First picture of Mt. Rainier, in Vaucouver's Journal, drawn from southern part of Admiralty Inlet. (From *Vaucouver's Discovery of Puget Sound*, Macmillan, London, 1907)

In June 1824, well briefed by Menzies and Hooker, he sailed on a Hudson's Bay Company vessel for the North Pacific Coast to develop the vast field which Menzies had discovered. And he was delighted to find a school friend, the surgeon botanist John Scouler, serving as medical officer to the ship.

Cape Mendocino, south promontory.

It was a long voyage – almost nine months before they reached the mouth of the Columbia, and another six weeks before they could navigate the river and land at Fort Vancouver, the Hudson's Bay trading post. *Gaultheria shallon* "was the first plant I took in my hands" he wrote in his diary; "so pleased was I that I could scarce see anything else."

During the summer Douglas and Scouler explored together between Fort Vancouver and Fort George (Astoria), and when Scouler returned to England in late September he took with him the first consignment of Douglas's seeds and specimens. Many of the newly discovered plants, including the tall blue *Campanula scouleri,* were named for him in memory of those companionable days.

From then on, except for Indian guides, 25-year-old Douglas explored, for the most part, alone. Fort Vancouver was his home base, and he was ever grateful for the help and kindness given him by people of the "Governor and Company of Adventurers of England trading into Hudson's Bay."

They were hard and often fearful days. He confessed that at first he looked with a "sort of dread" on the prospect of a night under the stars. He lived on meager rations. Supper was often a piece of sturgeon, a slice of bread, and a basin of tea – tea he considered "the monarch of all foods" after fatiguing journeys.

Douglas counted the sugar pine, *Pinus lambertiana,* which he named for Lambert, author of the great work on the genus *Pinus,* his greatest discovery. On a late October day accompanied by an Indian guide, he found the tree in the Umpqua country, but being forced to retreat from a band of hostile Indians, secured only three cones.

He made camp alone that evening, sending off his Indian guide lest he betray him, and constantly expecting attack, lying on the grass with his gun beside him he wrote up his diary "by the light of my Columbia candle, namely a piece of wood containing resin." The story of that day as he wrote it is one of the most dramatic of all plant-hunting stories.

Two years he spent in the Pacific Northwest, returning to England for a brief stay, and by May 1830 was back on the Columbia again. On this, his last expedition, Douglas covered a much wider field. Before the year was out he sailed down the coast to Monterey and there on a January day picked first Menzies' *Ribes speciosum;* then a plant of his own finding – *Nemophila insignis,* baby blue-eyes – "a lovely but humble plant" he called it, "the harbinger of the California spring." Almost two years were spent in California and among the eight hundred plants Douglas collected he considered *Salvia carnosa,* the blue-flowered sage, his finest treasure.

In 1832 Douglas was back on the Columbia for the last time. From there he pushed north, collecting seaweeds and over 200 mosses in the Puget Sound area,

and then continuing north in the most inaccessible country he had so far attempted, reached the mouth of the Fraser River.

From then on the tide of fortune turned against him. On June 13, 1833, as he came down the Fraser River his frail canoe was dashed to pieces on the Stony Islands and he himself, carried down the rapids to the whirlpool below, was swept about in the current for an hour and forty minutes before being washed ashore. His collection of 400 plants and his diary of the expedition were lost.

Snow-blindness and the glare of the California sun had seriously affected his eyes and he was quite blind in the right eye. Yet, after only a short rest at Fort Vancouver, he set sail once more for California, taking sixteen stormy October days to reach Drakes Bay where the ship delayed for three weeks (during which time Douglas climbed Mt. Tamalpais) before proceeding south to the Sandwich Islands. There the following year, on July 13, 1834, at the age of 36, he was killed by a maddened bull.

David Douglas was not only the first to discover many Pacific Coast plants but also rediscovered and introduced into cultivation many which Menzies and Lewis and Clark had found before him. Curiously enough he forfeited, as Menzies had done, certain credit which was his due. In his journal he gave the names of eastern American species to trees of the West, not realizing that no single conifer and hardly one tree or shrub of any one genus is common to both sides of the continent. Menzies' "great flowering dogwood" still carried no plant-hunter's name.

Yet he has credit enough. His name lives with the names of many plants, with none more famous or familiar than the Douglas fir, undisputed king of the Northwestern forests. And although his reputation rests chiefly on the magnificent coniferous trees which he discovered, it should also be remembered that he reaped a tremendous harvest in California also, and was the first to introduce to cultivation that brilliant bunch of California annuals, the godetias, the clarkias, and the California poppy among them.

Even before Douglas's death other British plant hunters had joined in the search. The Irishman, Thomas Coulter who visited California in 1831, found the Matilija poppy which after his death Harvey the botanist named for him and for his friend, Romney Robinson, the Irish astronomer, *Romneya coulteri.*

Dr. William Fraser Tolmie, a Scottish surgeon with the Hudson's Bay Company, was the first white man to approach and collect on Mount Rainier. At sunrise on September 3, 1833 with Quilliliash, one of his Indian guides beside him, he stood on the snow-spangled summit of the peak which was named Tolmies Peak for him, and looked to the mountain "surprisingly splendid and magnificent" above him. There on those mountain slopes he found the dwarf penstemon that Hooker named for him, the deep blue bell-shaped gentian, and the curious "Youth-on-Age," *Tolmiea menziesii.*

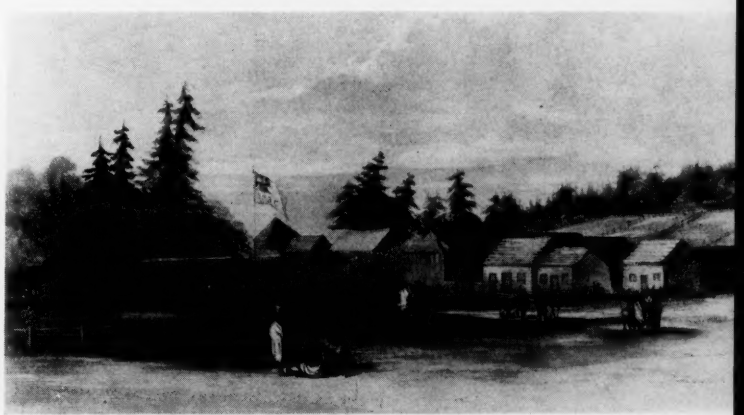
Thomas Nuttall the Yorkshireman had started work as a printer's apprentice and first went plant-hunting on his native moors. He came to Philadelphia as a young man and was already a famous botanist of 48 with an astonishing record of achievement and travel in the eastern states when he came overland to the Pacific Coast with the 2nd Wyeth Expedition in 1834.

Even for younger men the journey was arduous, but John K. Townsend, the ornithologist who accompanied Nuttall, said that no difficulty, no fatigue ever

Olympic Peninsula, from Cape Flattery to Mount Olympus.



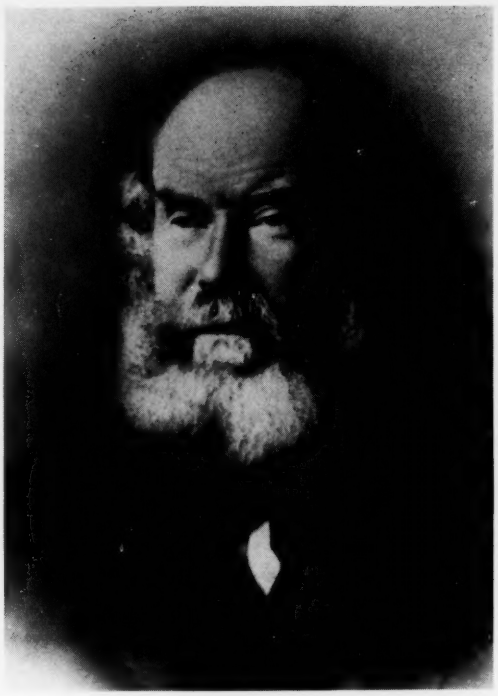
Dr. W. F. Tolmie, Hon. Horace Douglas Lascelles, Joseph Jeffrey, F. J. Skinner — front row. Joseph W. McKay — standing in doorway. (Provincial Archives, Victoria, B.C.)



Fort Vancouver. (From Warre and Vavasour, 1845. By courtesy of the Oregon Historical Society)

Panoramas from Vancouver's *Atlas*, 1798. (Courtesy the Bancroft Library, Berkeley)

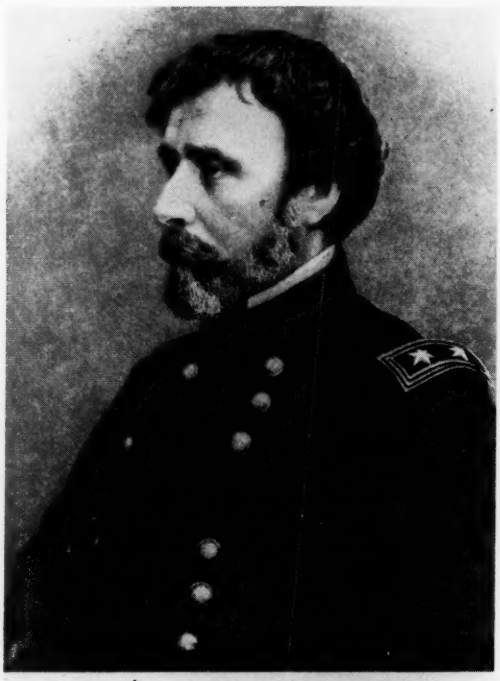
Dr. William Fraser Tolmie. (Photograph courtesy Provincial Archives, Victoria)





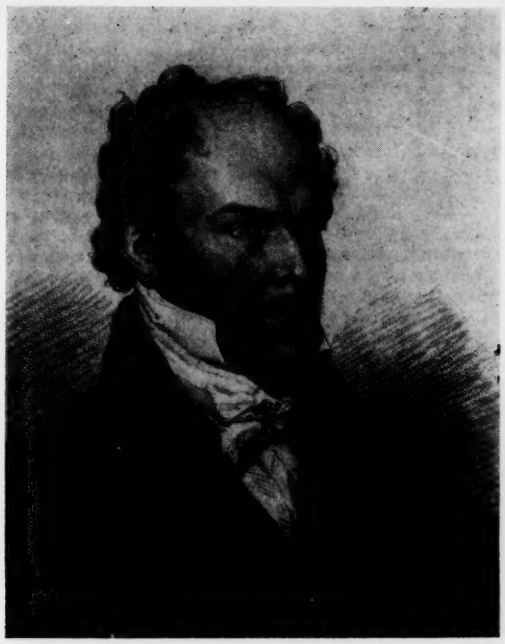
MATILIJA POPPY—*Romneya Coulteri.*

Opposite Page →
Thomas Nuttall in 1824. (From print owned by the Historical Society of Pennsylvania)



daunted him. He writes of Nuttall's absorption while collecting: of how he used the gun given him for protection as a tool with which to dig up his plants, thereby stopping the barrel up with earth; of the time when Nuttall's collection of plants was injured by wetting and he sat on the ground, steaming over an enormous fire, drying the papers and rearranging the whole collection, specimen by specimen, while the great drops of perspiration rolled unheeded off his forehead. And he describes how on crossing a particularly difficult stretch of country amid a profusion of flowers Nuttall "rode on ahead of the company, and cleared the passage with a trembling and eager hand, looking anxiously back at the approaching party, as though he feared

John Charles Frémont. (From his *Memoirs of My Life*, Vol. I, Bedford, Clarke & Company, Chicago and New York, 1887. From the collections of the California Historical Society)





Audubon's *Cornus nuttalli.* (From Vol. 4 of Audubon's *Ornithological Biographies*, 1834 ed. Courtesy of Trustees of the British Museum, London)



CALIFORNIA SLIPPERY-ELM—*Fremontodendron Californicum.*

they would come ere he had finished, and tread his lovely prizes underfoot."

Nuttall spent two years on the Pacific Coast before returning to Philadelphia, sailing by way of Cape Horn to Boston, a voyage recorded by Dana in his *Two Years Before the Mast.* Six years later he was back in England to inherit his brother's legacy of a Lancashire estate. It was 1842: the year that Archibald Menzies died; the year that Sir William Hooker became the first Director of Kew Gardens.

Thomas Nuttall was first and foremost a botanist. "He visited all the states of the Union" Asa Gray wrote "and has made more discoveries than any other explorer of the botany of the United States." He was also an ornithologist of note and an authority on conchology, mineralogy, and the American Indian.

How would he himself have chosen to be best remembered? By his *Genera of North American Plants?*

by his numerous collections? by the many plants of his discovery named for him? by the song of the white crowned sparrow, *Zonotrichia leucophrys nuttalli*?

He would, perhaps, have chosen the western dogwood, *Cornus nuttalli* which he found on his last exploration in the Northwest: the same "great flowering dogwood" that Menzies had first discovered; the same that Douglas noted yet failed to distinguish as different from the eastern tree. For Nuttall, when he saw the tree in the fall and the band-tailed pigeons feasting on the berries, counted six bracts instead of four, noted their larger size and perfect outline, and detected the absence of the dark scallop notch. He sent specimens of both birds and tree to Audubon. And there, in the 1834 edition of Volume 4 of Audubon's *Ornithological Biographies* you see the pigeons on a flowering branch of the tree, and underneath, Audubon's inscription on this "superb species of Dogwood, discovered by our learned friend Thomas Nuttall Esq.; when on his march toward the shores of the Pacific Ocean, and which I have graced with his name."

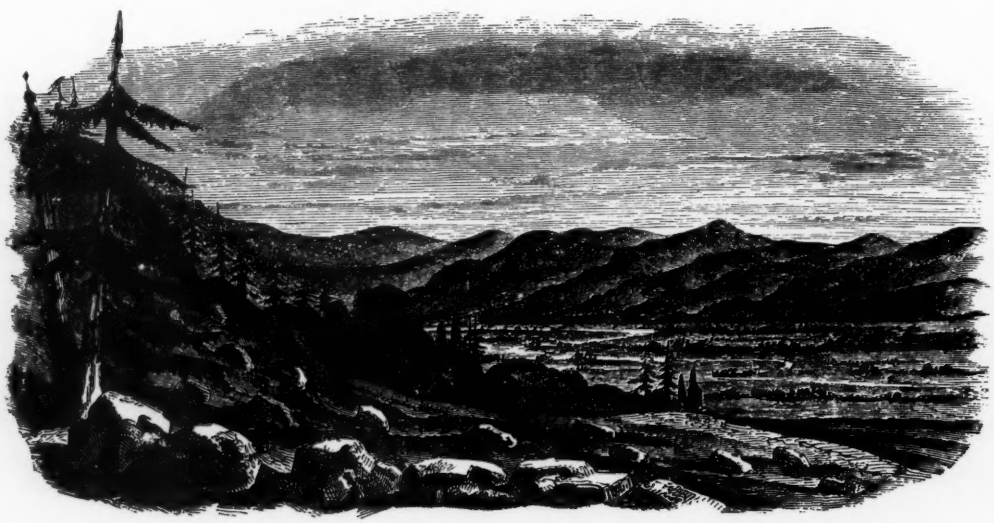
The first half of that great exploring century was almost ended. There was still a handful of plant collectors whose names are coupled with the western flora.

In 1844 Captain John Charles Frémont, the Pathfinder, collected on his military way. He found the western redbud, the snow plant, and the alpine pussy paws. He found, too, in the foothills above Fresno, the rare and beautiful endemic *Carpenteria californica* which Torrey named for his botanist friend Carpenter, and the thickset tree studded with golden flowers to which Torrey gave the name *Fremontia californica*.

And there was Theodor Hartweg, a German gardener, sent to California in 1845 by the London Horticultural Society, who first revealed the flora of the Sierra Nevada foothills; and the American collector Dr. C. C. Parry, who made the first of his many plant-hunting trips to the West in 1849. *Ceanothus parryi* and *Delphinium parryi* are but two from a score of plants that bear his name.

Lastly there is John Jeffrey, another Scot, who stands outside the half century by just one year. Little is known of him except that he was sent in May 1851 by the London Horticultural Society to collect in the region developed by Douglas. Because of his disappearance on one of his expeditions in California in 1853, because there is no trace of his journal and because none of his specimens survive in any American herbarium, he has been called "The Forgotten Botanist." This is not wholly true. His name still lives in *Pinus jeffreyi* — the Jeffrey pine with its dark bark and large cones — and in the lovely magenta-colored shooting star *Dodecatheon jeffreyi*.

It was Thomas Nuttall who, speaking for himself when he left for England, spoke also for many of his plant-hunting contemporaries: "Hardship and privation are cheaply purchased if I can but roam over the wide domain of primeval nature and behold another flora there of bolder hues and richer sweets beyond our garden's pride. . . . I bid adieu to the New World, its sylvan scenes, its mountains, wilds and plains. . . . I return, almost as exile, to the land of my nativity."



"Head Waters of the Sacramento." (From *Life, Explorations, and Public Services of John Charles Fremont* by Charles Wentworth Upham, Boston, 1856)

"Eugenie" the Dugong Mermaid

EVERYBODY has heard of mermaids, but who has actually seen one? We have not only seen a mermaid, we have caught one and brought it back alive from the Palaus, a group of coral-studded islands in the western Pacific north of New Guinea and east of the Philippines. Ours was not the mermaid of seafaring legends, of course, but the animal that became transmuted into one in the eyes of sailors too long away from home. This is the dugong, sometimes called the sea cow, whose curious proboscis and ancient history suggest the nickname of "seagoing elephant" to some observers.

ROBERT R. HARRY

Somewhere in the dawn of the Age of Mammals the fossil record may contain a common ancestor of sea cows, mastodons, elephants, hyraxes (the conies of the Bible), and some other groups that apparently died out before the Pleistocene. When they began to appear in the late Eocene, in Egypt, these widely divergent groups were well along on their separate evolutionary ways. Sea cows of those times, already completely adapted to an aquatic life, appear also in fossil beds of the same age in Europe and the West Indies, indicating a probable world-wide distribution. Two kinds of Sirenians, as the "mermaid" order is appropriately named, are living today – the manatee, which evolved in the Atlantic basin from West Africa to the mid-American region; and the dugong, which developed in the Pacific and Indian oceans.

Three species of manatee are living, one on the West African coast; one in southern Florida (where it has become rare but is now protected), the West Indies, and the Caribbean coast of Central America; and one on the north coast of South America down to the mouth of the Amazon. The manatee differs from the dugong in its rounded paddle-shaped tail and shorter, blunter snout.

The name dugong comes from *doyong*, Malay name for the animal. This Sirenian lives in the Red Sea, in the Indian Ocean, and in the western Pacific east to the Solomon and Marshall islands, and New Caledonia (according to MacMillan). But one species is recognized: *Dugong dugon.*

How much does the female dugong look like a mermaid? The Sirenian may be observed at the surface of the water, suckling her young at teats placed under the flippers with which she appears the while to be fondling the infant. The picture of motherhood – but let us take a closer look. The pink of the skin is decidedly grayish, and pricked with scattered coarse hairs or bristles. No beautiful flowing tresses adorn the whiskery head, than which nothing homelier can be imagined. Surely the most love-starved mariner must have been deep in his grog-cups to have seen here a vision of female charms! It seems more likely a good yarn was spun from imaginings stirred when the sea cow first appeared to discoverers in West African or Caribbean waters, but we do not claim to know which came first – mermaid or sea cow.

Although the dugong outdoes the manatee in sheer homeliness of face, it has the flattened whale-like (but not forked or scaly) tail of the mermaid as she appears on old charts and in *The New Yorker* cartoons. An adult dugong may grow to ten feet and half a ton – size would put it out of the mermaid class! It has nothing we can call a voice – the siren song was pure imagination inspired perhaps by a whistling sigh of air through the animal's nostrils or the reported lamb-like bleat of the calves.

The dugong's nostrils have valve-flaps to keep them closed under water. It is possible that they cannot breathe through the mouth, since natives of some tropical Pacific islands kill them, after spearing or netting them, by pushing wooden plugs into their nostrils to cause suffocation. The eye is very small and the auditory opening little more than a hole behind the eye. The mouth opens downward, from a bend in the lower jaw, allowing the short-necked animal to browse on the sea bottom. The upper lip is remarkably mobile, broad, fleshy, and cleft, although not as deeply as in the manatee. A peculiar provision is the ring of stiff bristles like a scrub brush which enables the dugong to grasp food with an action reminding one of vacuum cleaners.

Sirenian teeth show the order's relatedness to that of the elephants. Manatee molars or grinders are replaced from behind and move forward as in the elephant; while growing throughout life they are kept ground down in the manatee by the abrasive combination of silicaceous plant food and sand. The bull dugong has two ivory tusks in

the upper jaw, varying to 9 inches in length but three-fourths buried in flesh and jaw bone. These animals are placid, however, and are not known to use their tusks as weapons as elephants do, although it is possible they dig with them. Palauans state that dugongs push their tusks downward and forward through the sand on the lagoon floor, uprooting eel grass, clams, and sea cucumbers on which they feed.

The skeleton is massively strong, the bones noted for their weight and density, being solid with little or no marrow cavity. Ribs and skull are especially thick and heavy, holding the animal to the bottom at its will. Feeding, the dugong moves about with its flippers but not its tail.

Its habits have kept the dugong relatively little known. Living in small herds in shallow seas, lagoons, bays, and estuaries where eel grass abounds, the dugong got the name of sea cow, along with the manatee, from its rather bovine habit of "grazing" or browsing upon the plant life of the flat shallow bottoms. It has been said that they rest in deeper water during the day, but the broad paths cut in eel grass of the shallows reveal their nightly visits.

When the female is ready to give birth she is believed to go into river mouths and quieter waters. She bears just one calf at a time, as a rule, and tends it most diligently.

With no way of defending themselves, dugongs are shy and retiring, yet have on occasion suffered ruthless exploitation for their oil. In fact the dugong herds were reduced to such a degree that conservationists feared the slow-breeding animals would become extinct. Today they appear to be increasing in northern Australia and on the Great Barrier Reef; but in tropical Pacific areas affected by World War II they were all but wiped out by the pressure of food shortage, especially in the Palau Islands. Seriously overfished, the dugong is likely to become extinct there unless protected. The species should be protected, in fact, wherever it exists, to ensure its survival – it is of singular zoological interest and it captures the popular imagination as inspirer of the ancient mermaid myth of seafarers. Its loss to the world would be sad indeed.

THIS SITUATION made us very anxious to see dugongs in their natural habitat and obtain a specimen on "Project Coral Fish," the 1955 George Vanderbilt Expedition to the Palau Islands.* We searched in vain for over four months, throughout the eel grass beds in the lagoons, but failed in spite of advice from the old *yachads,* the sages among the Palauan natives.

A week before the expedition had to leave the area, a Palauan brought in a live young 5.5-foot dugong weighing 180 pounds, from eel grass beds bordering the largest of the Palaus, Babelthuap. The animal had been speared between the tail and the vital organs. At the time we didn't know how hardy dugongs are, in or out of water, but we got some indication from the way the islanders treated this one. After spearing it they tied it to the canoe, hauled it aboard, and brought it back to Koror Island – the trip taking several hours – while the dugong lay baking in the hot tropic sun out of

*The author wishes to acknowledge his indebtedness to the many individuals and organizations who made possible the 1955 expedition to the Palau Islands, and to thank everyone concerned. In particular he should mention the expedition colleagues, Frederick M. Bayer and H. Adair Fehlmann; the sponsoring organizations: George Vander-



water. Arriving in mid-afternoon, the Palauans decided to show off their prize catch to their friends. They dumped the animal unceremoniously into a jeep and toured the villages over rocky, chuckholed roads. Thoroughly shaken up from the grand tour, the dugong was next taken to an abandoned Japanese swimming pool at the end of "T-dock" on the north side of Koror. This pool is about 50 by 125 feet and filled with sea water which fluctuates with the tide from four to ten feet deep.

The following day about noon the expedition's people learned about the dugong and immediately went to T-dock for a look. It swam slowly around, showing no signs of distress. A great number of islanders, however, mostly young children, had come down to see this rarity and began jumping in to splash around with it. At first the dugong would swim very fast to the opposite end of the pool with strong, rhythmic up-and-down beats of the powerful tail. But by the next day it had become used to its little playmates and did not react at all to their antics.

As we watched it our unanimous thought was, what a wonderful thing it would be if we could fly the dugong alive to the United States – to the California Academy of Sciences, so that Dr. Earl S. Herald, curator of the Steinhart Aquarium (and a trustee of the George Vanderbilt Foundation) could exhibit it to the public and study its habits further under controlled conditions.

So we bought the dugong for twenty dollars and named it "Eugenie" – it was a female, the Palauans assured us – in honor of Dr. Eugenie Clark, director of the Cape Haze Marine Laboratory, Florida, who had collected fishes in the Palaus a few years ago and had reported upon a dugong in the Red Sea in her recent book, *Lady With a Spear.**

Our first worry was over what to feed our charge – the islanders insisted that Eugenie would only select from the menu white sea cucumbers and certain kinds of clams, but not eel grass. We were not easily convinced, however; those islanders who had offered the most advice and information on the habits of dugongs were among the first to come down to see one. They admitted, then, they had never actually seen a dugong alive before, except momentarily at a great distance when one stuck its nostrils above water to snatch a quick breath and submerge again. Their information was not first hand, but had been passed down to them by their elders who lived in a time when large herds inhabited these waters.

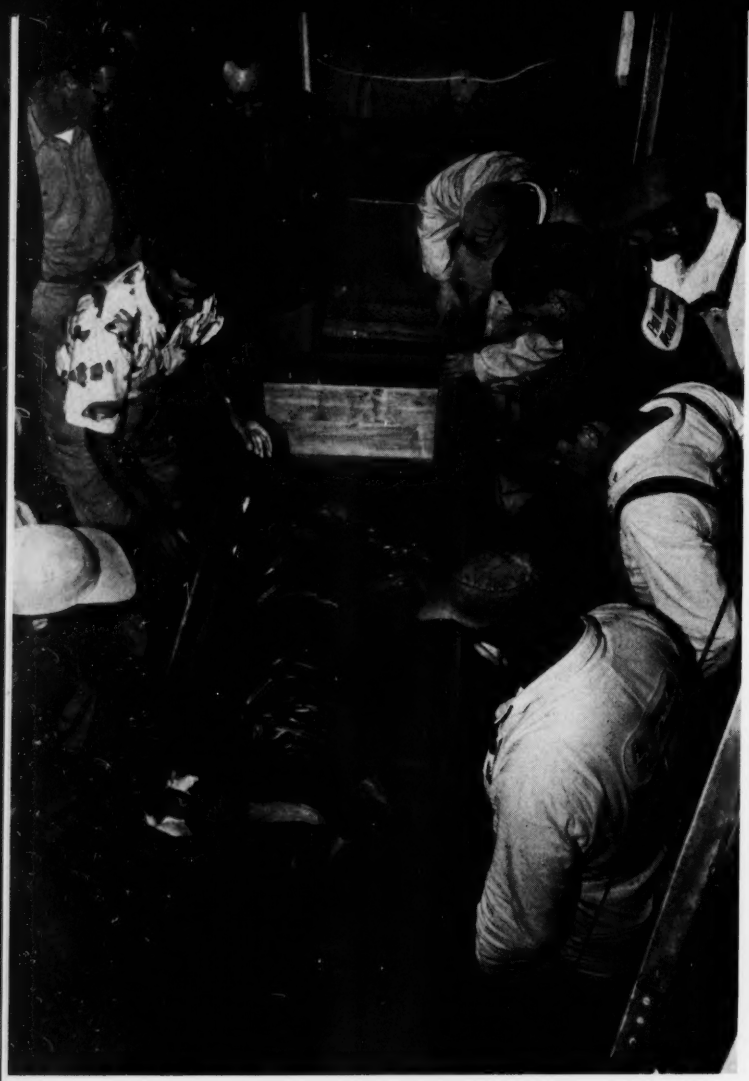
So my fellow expeditioners, H. Adair Fehlmann of Stanford University and Frederick M. Bayer of the U. S. National Museum, our Palauan helpers and I set out to search the sand flats for the food that would tempt our captive's appetite. Over the

*Harper & Brothers, New York, 1953. Reviewed in *PD*, November-December 1954.—Ed.

bilt Foundation, Office of Naval Research (under Contract No. 29157), Trust Territory Government of the Pacific Islands, Pacific Science Board (National Research Council–National Academy of Sciences); and Miss H. Joy Seddon, who helped the author care for the dugong between Guam and Wake islands and prepare this article.



Palau lagoons are home waters for the dugong. This composite panorama was taken from the lighthouse on Ngaremdiu Point, Urukthapel Island, looking west across the central Palaus. To the south (*left*) are the Eil Malk Islands; the islands in the center and to the north (*right*) are associated with Urukthapel. All water in sight is a lagoon.



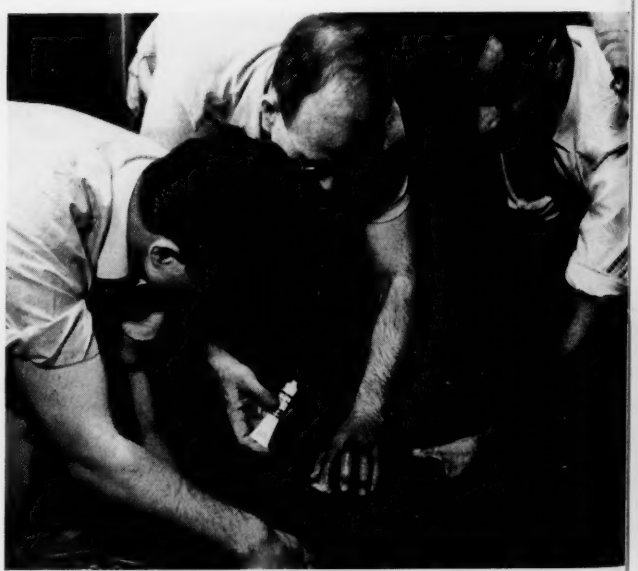
How to ship a dugong: scene at the San Francisco International Airport when Eugenie landed. (*Life*)

week we fed it 30 sea cucumbers and armfuls of eel grass, but no clams were to be found. We did not know then that dugongs will only eat food on the bottom. Apparently Eugenie never touched the eel grass we left floating on the surface, but the sea cucumbers sank to the bottom and presumably all were eaten. In fact, when the dugong was interrupted during breakfast one morning, parts of a sea cucumber were stuck in the upper lip bristles. There may have been competition, however -- the Palauans enjoy this kind of food. Suspicion was strong when we caught some children diving into the pool and collecting the slug-like animals off the bottom. Afterwards, we learned that if the eel grass was anchored to the bottom the dugong preferred it to anything else.

Our next problem was to get permission and clearances for shipping a live dugong into the United States. Since this was very likely the first time such a thing had been tried, the government officials solemnly searched for regulations concerning dugongs and mermaids but, to their consternation, found none. Would a whole set of sea cow regulations have to be enacted by Congress before Eugenie could leave the islands? At the critical moment Mr. Donald Heron, District Administrator of the Palaus, and Mr. Delmas H. Nucker, Deputy High Commissioner of the Trust Territory Government administering that area, quickly came to our aid and not only made the necessary arrangements but also provided air transport to Guam for our rare sea animal.

Now the shipping of a live animal the size of a sea cow is no small problem. Would it be able to withstand the long trip out of water? Must it be kept moist? Would it be able to expand its chest normally and breathe when free of accustomed water pressure? And what about the pressure of high altitudes in unpressurized cabins? These questions bothered us as we made preparations. We had no one to turn to for advice. Eugenie wouldn't talk. We just had to find the answers for ourselves as we went along.

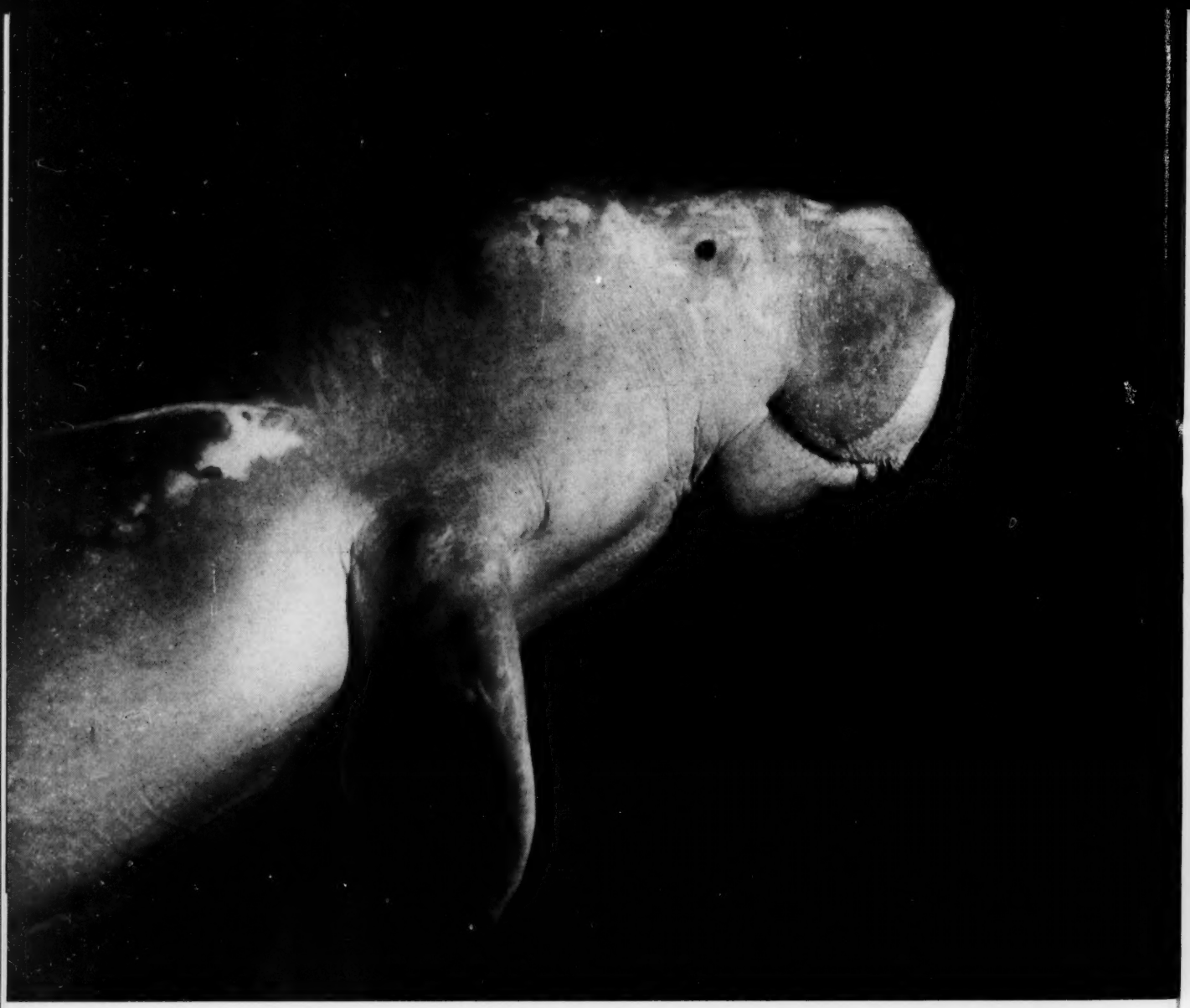
In the meantime Eugenie was blissfully paddling about in a private swimming pool unmindful of our worries or of the many people, young



↑ Dr. Earl S. Herald, Dr. W. E. Mottram, San Francisco veterinarian, and the author treat Eugenie's spear wounds with sulfa ointment. (C.A.S. photo: Elmer Moss)

→ View from inside the Steinhart Aquarium collecting truck taking Eugenie from the airport to Golden Gate Park. The nostril valves, open here, close when the animal is submerged. (This and photo upper left, courtesy *Life;* Robert Lackenbach, photographer)





What a profile! Note the tiny ear-hole back of the eye, and foreleg modified to flipper. (Cecil Tose)

and old, who flocked day after day from all corners of the Palaus to see the wonderful mermaid.

The day before the flight we went, loaded down with seines, lariats, face masks, and flippers, to catch Eugenie for a last check-over. But we needn't have brought the gear. All we had to do was to slip into the pool, swim quietly over to where she lay on the bottom, put our arms around her, and gently guide her over to the edge of the pool. The spear wounds we judged to be healing satisfactorily; but Eugenie's back had changed from gray to green! Since she had not been as active as in the wild state, a thick, velvety green coat of algae had grown on her back. But this washed off easily and seemed to do no harm. At this time we obtained our first close look at the remarkable dugong mouth and, aside from what has been described before, were interested in observing that there were medial horny pads on both lips and that the stiffer bristles on the lower lip were like short porcupine spines. The surface of the hide seemed to scar easily, although the skin was very thick and tough.

Next morning we returned to the pool to catch Eugenie. She was docile as ever but as we lifted her out of the pool she decided she wanted back

in and with a couple of swishes with her strong tail, flipped herself and two Palauans back into the water. But the next time out she made little fuss and we loaded her onto a truck for the beginning of the long trip. In order to help her breathe properly we placed her on a rubber air mattress and wrapped moist blankets around to keep her skin damp. A plastic raincoat wrapped around all this kept the warmth and moisture inside. All through this she wept copious tears – as an aquatic animal she had no other way to keep her eyes properly moist out of water. We took the cue and kept the eyes constantly washed out with saline solution. In the Moluccas, or Spice Islands in the East Indies, natives consider dugong tears a love potion and a drop of tear, so I have been told, is supposed to make a loved one develop a passion for the person possessing the tear. With dugongs so rare, the tears are worth a fortune.

Eugenie, air mattress and all, was carefully carried on board the TALOA seaplane and laid on the floor of the forward compartment. She remained fairly still during the flight to Guam, although we realized she must have been quite frightened as the plane took off and landed and bounced around in the air currents. We had a half-day layover in Guam while waiting to transfer to the Pan-American flight to San Francisco. Eugenie leisurely spent the time splashing playfully around in a large life raft filled with water in the lobby of the air terminal. She occasionally startled people passing by who expected this to be another demonstration of sea rescue equipment and were not at all prepared to see tail flukes sweep out of water at one end of the pool and Eugenie's head at the other, as she took a deep breath, winked her eye, and wiggled her lip bristles at them. Meanwhile the Trust Territory Government supply officers and we were struggling to build Eugenie a large light-weight crate to convey her and her air mattress back to California.

Soon we were off again and approximately 30 hours later Eugenie and I arrived, tired but happy, the trip a success. We were met at the San Francisco airport by Dr. Earl Herald and his aquarium truck completely outfitted with another life raft filled with 85°F. sea water, exactly the same temperature as her lagoon waters in the Palaus. Once again Eugenie was contented, but she must have been puzzled by the cold air and cool evening breeze compared to her nice warm tropical homeland. Amid strange new sounds of the airport and highway, she was whisked to her new quarters specially prepared for her at the Steinhart Aquarium.

Despite all the excitement over her debut as a film and television star, amid popping flashbulbs, Eugenie settled down in her new 2,000-gallon home. After a midnight snack of clams she immediately went to work like a good homemaker and scoured down the walls and floor with her built-in vacuum cleaner, disturbing her moray eel and sea bass neighbors out of a sound sleep.

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EUGENIE WAS NO LADY

A NEW AND SAD ENDING has to be written for the story of Eugenie the mermaid. Early on the morning of 27 December 1955 Eugenie died of her wounds. Stellar attraction at the Steinhart Aquarium, toast of San Francisco, feature of the newspapers, wire services, and national magazines, TV and newsreel celebrity, Eugenie was finally a victim of the circumstances that brought her to the pinnacle of fame. Pneumonia developed as apparent consequence of the condition of spear-wounds in the spinal column which autopsy revealed to be gangrenous and ultimately fatal. The body was weighed, photographed, and dissected; casts were taken of the head and flippers; various examinations were made in the interests of science – Eugenie died very young, but not in vain. The dissecting knife revealed one final, and vital, fact: Eugenie should have been named Eugene. But who cares about mer*men*?

Dr. Herald and his staff at the Steinhart Aquarium hope that the unprecedented worldwide interest in—so far as we know—the first dugong brought alive to an American aquarium will stimulate an effort to repeat the performance under conditions which will insure its success, and at the same time enable science to learn many new facts about this, one of the world's most interesting animals.—EDITOR.

The Case for 'Frog Men' on Venus

IN THE EARLY 1920's this writer became avidly interested in a new form of magazine literature, qualified as "amazing," and dignified by the more accurate description "science fiction." Parental disapproval was evident until, in one issue, as though deliberately planned to ease tensions between youthful readers and their literary guardians, there appeared a story by each of the famous authors, H. G. Wells and Jules Verne. From then on, science fiction was in business, with a good customer in our house.

Science fiction plots were easily concocted in those days. The field was wide open. Space travel, time travel, strange creatures, inventions — nothing was worn out. An exciting plot could even compensate for an otherwise mediocre story, and very often did.

One of the favorite story locales chosen by the early science fiction writers was the planet Venus. The modern trend is toward Mars, but Venus held the fancy of both writers and readers thirty years ago. It was a cloud mantled world of mystery. Interplanetary explorers, upon penetrating the perpetual rain clouds of Venus, found a world covered by tropical swamps and seas teeming with life forms either entirely strange or paralleling the life-forms of earth during the Paleozoic or Mesozoic eras. The "frog men" of Venus were an obvious development, for what other intelligent creature could there be on so watery a world?

Venus seemed to be most ideally situated as an abode for life. It is nearer the sun than the earth is — a little less than three-fourths as far. This would make it a warmer planet, but the cloud cover might temper the climate, and if it were covered largely by extensive seas, life might thrive in the warm waters of coastal shelves. It was argued that Venus was a younger world than the earth and might well be in the stage of formation which the earth was in a hundred million years ago. The modern idea is that all the planets — at least the terrestrial planets, Mercury, Venus, Earth, and Mars — evolved at the same time, from the same material. The fact that Venus is only slightly smaller than the earth leads one to expect largely the same conditions on both worlds. But a rather shocking disclosure was to come.

The fictitious "frog men" died a horrible death, ground under the juggernaut wheels of *observation.* They were destroyed before the inexorable march of science. The clouds of Venus were shown to be devoid of water, the planet a dry, desert world where shifting sands replaced the restless seas. The atmosphere was analyzed by the prying eye of the spectroscope, and the verdict was *no water vapor,* at most not more than 5 per cent of the water in the earth's air above the height of one mile. The spectroscope revealed an overabundance of carbon dioxide and no evidence of oxygen. It left many of the admirers of the frog men with their tongues hanging out in sympathy for the poor creatures sentenced to death upon the parched and eroded land of a dry and dusty world. The clouds of Venus were possibly nothing but the perpetual pall hanging over a planetary "dust bowl."

Venus is still a planet of mystery. It seems paradoxical that the nearest of the planets can so completely hide many of the facts that are so accurately known about other more distant worlds. The period of rotation of Mars is known with an accuracy of about 1/50 second, while the nearest we can come to the rotational period of Venus is to state that it is somewhere between one and ten weeks. The best compromise is given by F. E. Ross as about 30 days. The "geography" of Mars is well known, the locations of the poles accurately established. But observers are in wide disagreement as to the location of the poles of Venus. The temperature of the surface of Mars is pretty well known over the entire planet, and while the temperature of the upper surface of the cloud cover of Venus has been measured at near 26° below zero Fahrenheit, (not unlike the temperature at a similar height in the earth's atmosphere), only guesses can be made about the temperature at the solid surface of the planet.

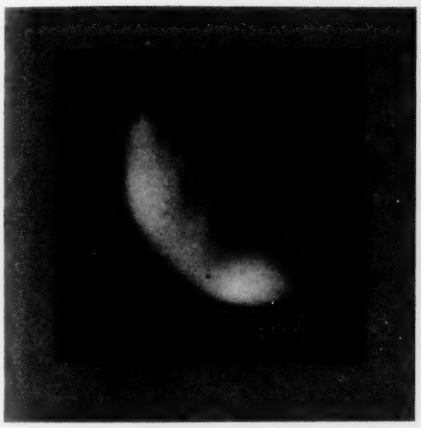
All this uncertainty arises from the presence of the all-pervading cover of brilliant white clouds. Faint markings can be detected by visual means, and photographs made in blue light and in ultraviolet show similar markings, but these are quite evidently irregularities in the cloud cover and are constantly changing. So Venus, the "twin of the earth," has never emerged from the veil. Venus, the goddess of beauty, hides modestly beneath a cloak which only the artist has loosed. Yet she flaunts her mysterious beauty constantly before the eyes of man.

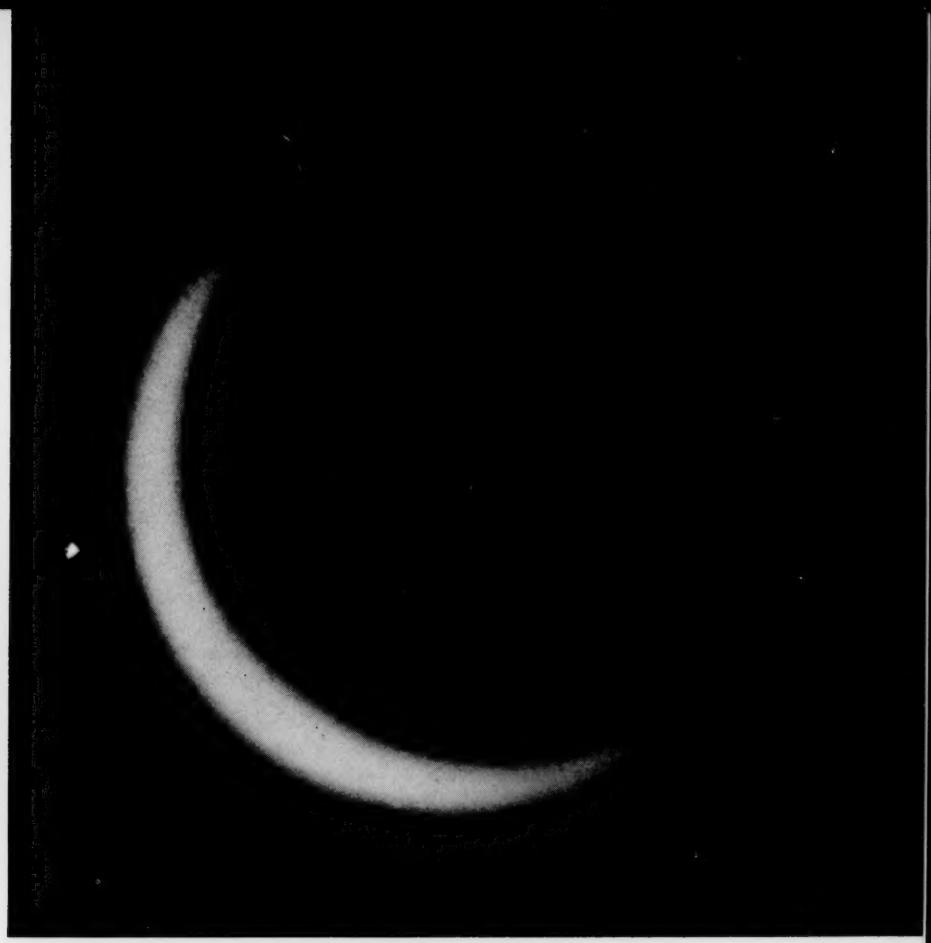
Venus hangs, unbelievably bright, alternately in the evening and in the morning sky. Among the ancients, the two appearances were considered to be that of two different objects known as Phosphorus when seen in the morning, Hesperus when seen in the evening. Venus is swinging out from behind the sun at the present time and will move farther away from the sun in the sky, becoming more brilliant and more dominant in the evening sky all through the winter and spring of 1956. It reaches its greatest apparent distance from the sun on April 12 and is most brilliant on May 16 when it has a magnitude of −4.2. Venus may be seen in the evening sky in the same relationship to the sun every 584 days or about 19 months.

If Venus is stubborn in hiding her secrets, man is equally unrelenting in his probing search. Recently two leading astronomers at the Harvard College Observatory, Donald H. Menzel and Fred L. Whipple,

Conducted by George W. Bunton & Leon E. Salanave

Venus — two photographs reproduced in the proper relative sizes of the planet as seen at two phases. Venus appears largest when it is between us and the sun, for it is closest to the earth at that time.





These two views of the planet Venus show the change in phase which takes place as it travels around the sun. The "half-moon" phase was photographed on February 2, 1937, with ultraviolet light. Faint cloud markings can be seen in this view. The thin ring of light in the other photograph is the appearance of the planet when it is nearly between us and the sun. Sunlight illuminates the atmosphere, and at this "new" phase the illumination produces a complete ring around the planet. This photograph was made in red light on November 20, 1938. Red light passes more readily through the atmosphere, making such a photograph possible. (Photographs by J. B. Edson and E. C. Slipher, Lowell Observatory, Flagstaff, Arizona)

have attacked some of the discrepancies that appeared in the observational facts. Starting with some evidence presented by B. Lyot in 1929, they have worked up a very convincing case for the clouds of Venus being made of water droplets after all.* They have shown by careful analysis that, owing to the low temperature, the amount of water vapor in the upper atmosphere of Venus might escape detection and yet the planet be entirely covered by water. To justify the high carbon dioxide content in the atmosphere they point out that an all-pervading sea would isolate the atmosphere from contact with the silicates of the sea bottoms, and the combination of the gas with the silicates to produce carbonate minerals would be greatly retarded. On the earth this process has removed most of the carbon dioxide from our air because of the vast land areas exposed to the atmosphere.

If the case is improved for the Venusian seas, then so is the case for the "frog men!" Earth-like, oxygen breathing animals are still impossible on a world where the atmosphere is mostly carbon dioxide, but who said anything about the frog men being earth-like animals? Many of us will settle gladly for the resurrection of their desiccated remains from the sandy wastes, to imagine their sporting in the waves of a planetary sea, in a whole world of privacy, hidden, perhaps forever, from the strange oxygen breathers on their neighboring planet Earth — those prying creatures who so nearly cost them their lovely sea. Long live the frog men of Venus! G.W.B.

*_The Case for_ H_2O _Clouds on Venus._ Publications of the Astronomical Society of the Pacific, June 1955, Vol. 67, No. 396.

DISCOVERY IN BOOKS

The exploring breed

Captain Cook and the South Pacific: *The Voyage of the "Endeavour" 1768–1771.* By John Gwyther. Houghton Mifflin Company, Boston. 1954. xii + 268 pp., 8 halftones, endpaper map. $3.50.

A young Royal Navy lieutenant on wartime watch in the southwest Pacific found time to reflect on what he and his shipmates owed to the man whose name appeared so often on Admiralty charts and in the *Pilot* – Captain James Cook. Thoughts of this extraordinary man whose survey work in unknown waters had endured so well, drove John Gwyther, home from service, to seek out every detail of the great seaman's life and voyages.

A book was bound to result, and although it partly comprises excerpts from Cook's own journal, it is far from a rehash. To begin with, there is the biting picture of the Royal Navy two centuries ago, a picture whose contrast to the present perhaps only a modern navy man can fully appreciate. Then comes the excellent short biography of Cook – the Yorkshire farm boy who by sheer force and quality of character rose from before the mast on a collier to a permanent place among England's foremost naval heroes – up to the time he took command of the *Endeavour* for the voyage to observe the transit of Venus from Tahiti and, under sealed orders, to look for a southern continent.

Few readers today have time for the proper enjoyment of Cook's own published journal of his historic first Pacific voyage. But Gwyther has so thoroughly absorbed his subject that in condensation nothing is lost of the spirit of the full account. And not only have the excerpts been woven in most skilfully, they have been selected with an unerring feel for the right moment to put something in Cook's own words, whether briefly or at several pages length.

This telling of the first of Cook's three voyages is so satisfying, indeed, we can but hope John Gwyther will do the same kind of job on the second and the fateful third.

Humboldt: *The Life and Times of Alexander von Humboldt 1769–1859.* By Helmut de Terra. Alfred A. Knopf, New York. 1955. 386 + ix pp., 8 halftone plates, 3 text maps. $5.75.

It has been said of Alexander von Humboldt that he "was perhaps the last man whose personal genius and position in time enabled him to know everything worth knowing about science in his day." Be that as it may, it is certain that Humboldt is worth knowing to anyone, genius or otherwise, who would consider himself educated in science today. Moreover, he should be known – well known – to everyone else, for the reason that he must be included in any list of a score or so of the outstanding geniuses of all time.

The pesent biographer was specially qualified by his own scientific background to interpret Humboldt as scientist, and by his exploring experience to appreciate Humboldt as explorer. And Dr. de Terra is cosmopolitan enough to deal sympathetically with Humboldt as an aristocrat and man of affairs in the official and social world of his era.

Considering some of the material of this present issue, it is worth noting that Humboldt founded the science of plant geography. Other modern sciences deeply indebted to him are anthropology, astronomy, botany, geography, geology, geophysics, meteorology, oceanography, physiology, and zoology – de Terra summarizes his contributions to each. There are 24 geographical features listed, bearing Humboldt's name, 18 of them in the United States, a country he loved and admired.

The oddly assorted books listed and discussed below have one thing in common: they have to do with pioneer discovery in the kingdom of the world's living plants. In time, they reach from early 18th century to mid-20th; in space, around the globe. They provide a wide variety of further reading to anyone whose interest in botanical exploration and explorers and some of the things they stir up is aroused by the article on that subject in this issue.

New Green World. By Josephine Herbst. Hastings House, New York. 1954. 272 pp., 10 halftones, endpaper map. $4.00.

The Botany of Cook's Voyages, *and its Unexpected Significance in Relation to Anthropology, Biogeography and History.* By Elmer Drew Merrill. *Chronica Botanica,* Volume 14, Number 5/6. The Chronica Botanica Company, Waltham, Mass.; J. W. Stacey, Inc., San Francisco, Calif. 1954. Comprises pp. 164-384, Plates 80-92 (halftone); 22 text figs. in line. Special edition, cloth, $4.75.

Pioneer Plant Geography: *The Phytogeographical Researches of Sir Joseph Dalton Hooker.* By W. B. Turrill. *Lotsya* – a Biological Miscellany; edited by Frans Verdoorn. Martinus Nijhoff, The Hague. 1953. xii + 167 pp., 21 halftone plates. $6.00.

Alice Eastwood's Wonderland: *The Adventures of a Botanist.* By Carol Green Wilson. California Academy of Sciences, San Francisco. 1955. iv + 222 pp., frontis., line decorations. $5.00.

Plant Hunter in Manipur. By F. Kingdon-Ward. Jonathan Cape, London. 1952. 254 pp., 12 photos, inset map. $3.25.

"The wonder of a plant and its fabulous parts . . . geared to a profound respect for facts, harmonized by a rational mind . . ." Such, in the words of Josephine Herbst's Foreword to **New Green World,** was the urge and mold of the life of John Bartram, pioneer American botanical explorer. This mold and cast took shape in the 18th-century New World, when a man could be strongly and consciously himself yet respond in full to challenges unending and horizons apparently unlimited. While large-scale exploitation of virgin land was the goal of most of these firm, practical individualists, the few like Bartram enjoyed fulfillment in wonder at the vast order and minute detail of nature. To grasp these was their sufficient challenge.

John Bartram "was a sound practical American farmer." But as he tilled his 100 Schuylkill River acres, his inner nature compelled him to observance of nature around him. "From the moment that he settled with himself that botany was his chief and burning interest, his life had begun to expand. He had become an explorer, a gatherer of seeds, the maker of a garden already unique for its cultivation of rare native plants." *New Green World* is the story of his travels, ever farther from base, to the Great Lakes, up and down the Appalachian chain, in later years at last to Florida's St. Johns River when that was a jungle road. For his seeds and cuttings, even for turtles, he found a lifelong market with rich English gentlemen, mainly through an eccentric London correspondent, Peter Collinson. Miss Herbst has happily drawn much of her book directly from the bulky and numerous letters these two sent across the Atlantic through

the decades until Collinson died. And after John Bartram's turn had come, in 1777, the story goes on with his son—William Bartram became a great nature artist.

This is a story of a time as well as of men. Natural America had become the wonder and delight of Europe in that century. But it was individuals, the Bartrams chief among them, who shipped wonder to European eyes and minds. John Bartram, finally, was perhaps first to warn that America's wonders could be lost in the onrush of settlement. He was our first great conservationist, while explorer to the end.

Far to the west, during John Bartram's later years, a vaster exploration was in progress, unlocking the last geographic secrets of the Pacific World to the edge of the Antarctic. Captain James Cook was turning the key, in the course of three voyages between 1768 and 1780. Naturalists shipped with him, notably Joseph Banks and Daniel Solander on the first voyage and the Forsters, father and son, on the second. Dr. E. D. Merrill's book, **The Botany of Cook's Voyages,** hinges on the unique importance of the work of these men as plant collectors among the islands of the Pacific and on the shores of its borderlands. The book evaluates the collections and resultant publications in terms of what they prove and disprove, support and weaken among a welter of conflicting theories about plant and human origins, dispersals, and transmigrations.

As island after populous island was discovered in the farthest Pacific, Europeans naturally began to wonder how these handsome, intelligent people got there and, even more, where they came from. Anthropologists and geographers alike admit various plants in a given place as proof that man was there — the plants he has long used, and his timeless camp followers, the dooryard weeds. It is easy to say man was here, from admissable evidence; it is something else to prove the how, the when, the where from. The Pacific has become the favorite arena of embattled migration theorists. If all the comings and goings across it ever postulated had actually occurred, its waters must for some millennia have looked like New York Harbor on steamer day and its atolls like Grand Central Station at rush hour.

Dr. Merrill (Arnold Professor of Botany, Emeritus, Harvard University), has weighed the plant evidence as a systematic botanist. He argues that the extreme theorists like Heyerdahl *(American Indians in the Pacific)* and Gladwin *(Men out of Asia)* are simply not equipped to evaluate botanical sources with sufficient competence. Even so solid a geneticist as Anderson *(Plants, Man and Life)* or so tough-minded a biogeographer as Sauer *(Agricultural Origins and Dispersals)* can go astray through lack of wide experience in the material and applications of plant taxonomy.

It is impossible in a few lines to convey the scope of this complex but to this reader strangely exciting book. Though full of years Dr. Merrill has shoved off like a veteran admiral into troubled waters with full steam up, launching broadsides right and left at the extreme diffusionists (as his chief adversaries may be called) and scuttling some of their leaky sources. The reading is great fun for anyone who loves an intellectual bout at close quarters. It does not matter so much whether you believe at the outset that Polynesian Islanders were eastbound Malaysians, westbound Peruvians, southbound North American Indians, or what have you, or whether certain plants got to certain islands in bird-droppings or breadbaskets, or just grew there. You will come out of it with your curiosity perhaps more stimulated than satisfied, but in any case with your mind sharpened to many of the intriguing possibilities that plant exploration can open up — perhaps especially the possibilities of ultimate certain knowledge in some of the still dark areas of human history. (Though his style is vigorous and utterly unpedantic, Dr. Merrill has not written with the general reader in mind, it should be noted; but for one interested in the larger questions raised and not to be scared off by lengthy notes and erudite references, any effort it takes ought to be well rewarded.)

John Bartram was a splendid example of the 18th century man reveling in nature. Moving to the 19th, no more representative man at home in the natural world could be found than Joseph Dalton Hooker, 1817-1911, a giant of the century in his way. His was the way of the mind out to grasp the world picture, in his field, in the manner laid down by Humboldt. The world's floras were sufficiently known by mid-century to admit the world view, however incomplete, and pave the way for modern interpretations.

Writing from Hooker's own headquarters at the Royal Botanic Gardens, Kew, W. B. Turrill has given, with **Pioneer Plant Geography** the definitive summary and critique of the researches and views of the great world-traveling taxonomist. The work is naturally intended for serious students of botany, especially those concerned with the historical growth of their science; but it is so enriched by direct use of Hooker's own travel notes and observations and reflections on a world still opening to science, that one with more general interests can roam through it with delight and profit.

J. D. Hooker lived ninety-four years; so did our own Alice Eastwood. Born in 1859, the year Humboldt died, she nearly bridged the century from our own day back to the early 19th century plant explorers of the article in this issue of *PD*. She contributed her full share to taxonomy, but she will be remembered best as a true explorer. All of our own West, from the Rockies to the Coast, was **Alice Eastwood's Wonderland,** to name the intimate biography by Carol Green Wilson. Reading it, one born at the tail end of the "wide open spaces" era may envy one who lived through so much of it. Yet the essence of Alice Eastwood was perhaps timelessness — she truly lived for the wonders of today, any day and every day of her marvelously full and completely dedicated life. Mrs. Wilson has caught this quality of sustaining exaltation and transmitted it so well that the reader finds himself racing almost breathless to the next point in wonderland with the gallant woman w[illegible] loved plants and life equally. May the exploring breed never die!

"Plant hunting necessarily involves travel," F. Kingdon-Ward says in his brief Preface to **Plant Hunter in Manipur.** This is a book to remind us the world is not yet fully explored. A professional plant hunter on a mission from the New York Botanic Garden, the author sought plants of the East that could be cultivated in California and our South. Manipur is hill country on the Assam-Burma border, wild enough to challenge the adventurous, unexplored enough to yield a glorious new lily and — to an able writer — material for a book in the best nature-and-far-places tradition. The exploring breed is very much alive! D.G.K.

FROM THE READER

Nice bouquet

EDITOR, *Pacific Discovery:*

This is not just a note to advise you that another individual reads *PD* but to tell you, in my opinion, it is one of the best two museum house organs published by science museums in this country. You have indeed established a very fine pattern and consistently maintained the quality of articles and illustrations. Best wishes for 1956.

ROBERT T. HATT, *Director*

Cranbrook Institute of Science
Bloomfield Mills, Mich., 30 December 1955.

More archeology

EDITOR, *Pacific Discovery:*

I noticed in the November-December issue there were requests to suggest what we want. I and a couple of friends are particularly interested in archeological material – Indian or ancient – also the fields where anthropologists might be employed most frequently. You have an interesting magazine.

VERNIE MCCANN

Fresno, Calif., 12 December 1955.

Dancers of Monte Alban

EDITOR, *Pacific Discovery:*

Regarding the well documented essay by Annette H. Richards on "The Dancers of Monte Albán" [*PD*, July-August 1955], the enigma is perhaps not as enigmatic as it may seem. The sanctuary of Monte Albán was not a kind of Lourdes, nor a kind of "medical textbook." It is natural for the archeologist and the doctor to reach mistaken conclusions, since the phenomenon of those Dancers cannot be captured by the rational manner of thinking of our times. As in all ancient Mexican art, one must depart from the decisive factor: the magical-mystical thinking of those peoples. From that point of view, even those Dancers explain themselves very naturally. Last year I published in "Mexico en la Cultura," Sunday supplement of the newspaper *Novedades*, a study of those reliefs . . . in which I attempt to interpret them on the basis of the essence of the Sacred Dance.

PAUL WESTHEIM

México, D.F., 25 September 1955.

Paul Westheim is author of the exceedingly well documented book, Arte antiguo de México, *mentioned editorially and reviewed in the same issue with Miss Richards' article.*

Echo of Dinosaur

EDITOR, *Pacific Discovery:*

. . . To compliment you upon your competent observation in March-April (1955) number, regarding the "Utah Wildlife Federation." "Subornation" is the word that has been escaping me to adequately express what many people feel about the desecration – I suppose you could call it – of the good word Conservation, in various spots about the countryside. In southern California we have the "Southern Council of Conservation Clubs" and what a desecration that is! Then we have the organization known as the California Wildlife Federation, which is a lobby arrangement which practically clears all wildlife resource matters, to the delight of the shooting fraternity. We hope that some day some pioneering and fearless soul with an audience will set the public straight on such matters.

HENRY M. WEBER, M.D.

Indio, California, 24 December 1955.

Where was Mr. Gould?

EDITOR, *Pacific Discovery:*

In the review of *Mr. Gould's Tropical Birds* in the November-December 1955 *PD*, the statement, "Gould traveled the world from the Andes to the Himalayas," if true, is probably an important biographical discovery.

The plates of Himalayan birds, his first folio illustrated work, were made from bird-skins he received as a collecto the principal museums of Europe, to Australasia (1838-1840) and to the United States. He came to this country,

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Evolution of the Vertebrates: *A History of the Backboned Animals Through Time.* By Edwin H. Colbert. John Wiley & Sons, Inc., New York; Chapman & Hall, Ltd., London, 1955. xiii + 479 pp., 122 text figs. in line. $8.95.

"A survey of the fossil record of backboned animals" would strike some people as being the ultimate in dry subject matter. This view may stem in part from the arid look of many textbooks of paleontology, with their sterile illustrations captioned "after so-and-so." If an inviting new text, with fresh new illustrations, can stimulate interest in its subject, Dr. Colbert's book must surely have widened horizons for the science that treats of life in the past. Curator of fossil reptiles and amphibians in The American Museum of Natural History and professor of vertebrate paleontology in Columbia University, the author of *Evolution of the Vertebrates* has set out to bring present knowledge, with a minimum of technicality, within the reach of the layman as well as the student.

It has come to the editor's attention that *PD* has stimulated some of its lay readers to build their own libraries of useful "background" – or general – works as well as some special-interest books to carry them further into fields touched by our articles. In its subject the present book is well designed to fill a gap in numerous private – and public – libraries as well as in college classrooms.

"Alphabets, Books, and Civilization"

Books mentioned editorially, pp. 2-3:

The Triumph of the Alphabet: *A History of Writing.* By A. C. Moorhouse. Henry Schuman, New York. 1953. 223 pp., 41 text figs., 12 halftone plates. $3.50.

The Shaping of Our Alphabet: *A Study of Changing Type Styles.* By Frank Denman. Alfred A. Knopf, New York. 1955. 228 pp., numerous illus. in halftone and line. $5.00.

The Alphabet: *A Key to the History of Mankind.* By David Diringer. Second and Revised Edition. Philosophical Library, New York. 1953. 607 pp., 256 figs. in halftone and line. $12.00.

The Hand-Produced Book. By David Diringer. Philosophical Library, New York. 1953. 603 pp., 185 figs., mostly halftone. $15.00.

Robert Estienne, Royal Printer: *An Historical Study of the Elder Stephanus.* By Elizabeth Armstrong. Cambridge University Press, New York. 1954. xxi + 310 pp., 8 halftone plates, 15 text figs. $10.00.

as reported in "The Proceedings of the Zoological Society of London" (report of meeting of July 14, 1857), "whither he had proceeded for the purpose of studying the habits and manners of the species Trochilus frequenting that portion of the American continent."

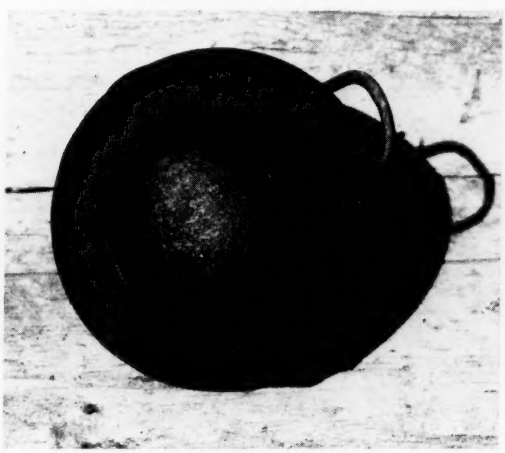
For *The Zoology of the Voyage of H. M. S. Sulphur, under the command of Captain Sir Edward Belcher . . . during the years 1836-1842*, Edited . . . by Richard Brinsley Hinds, Esq., Surgeon, R. N., Attached to the expedition . . . (Vol. I, London, 1844), Gould furnished 15 plates of birds, but there is no evidence known to me that he was aboard during any part of the voyage. (This very scarce volume is in the Natural History Museum Library, Stanford University.) Had he been "attached to the expedition" he would have had the opportunity of calling at San Francisco. The ship remained here a few weeks. Boats ascended "Rio Sacramento" as Miss Eastwood noted in her *Early Botanical Explorers on the Pacific Coast . . .*, where she tells the facts of the naming by Jepson of a California black walnut, *Juglans Hindsii*.

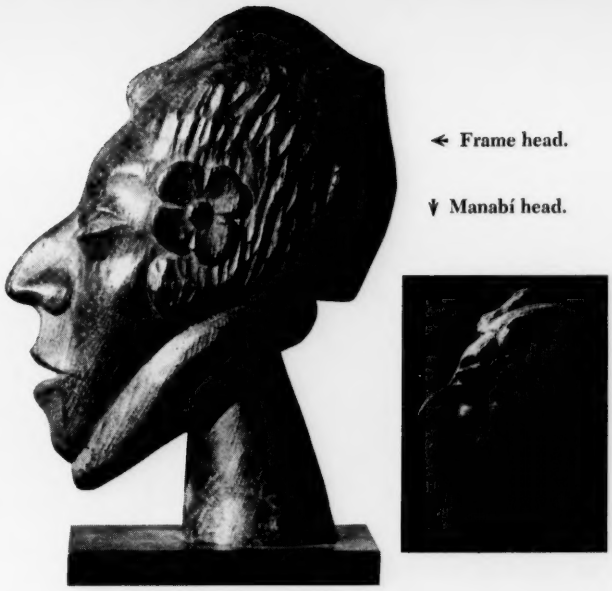
The superlative artistry, and the preserved brilliance and sheen of the colorings of Gould's originals are particularly striking today. Gould, in a companion 8vo volume of text to the five volumes *The Birds of Britain* (1862-1873), 367 plates, said: "Many of the public are quite unaware how the colouring of these large Plates is accomplished; and not a few believe that they are produced by some mechanical process or by chrome-lithography. This, however, is not the case; every sky with its varied tints and every feather of each bird were coloured by hand; and when it is considered that nearly two hundred and eighty thousand illustrations in the present work have been so treated, it will most likely cause some astonishment."

Any new facts on Gould's life and travels would make interesting reading. EDWARD A. MAYERS

San Francisco, 3 January 1956.

We regret the slip that inadvertently put Mr. Gould in the Andes and Himalayas (he did indeed travel extensively in Australia); but we are happy to have drawn thereby so interesting and informative a letter as Mr. Mayers'. We trust all our slips will show to the reader and be called to our attention.





← Frame head.

Manabí head. ↓

Pacific Profile

EDITOR, *Pacific Discovery:*

The September-October [1955] cover of *Pacific Discovery* was most attractive. It was altogether a fine issue. I thought you would be interested in learning of the appeal your cover had for one of your readers in southern California. Mr. Joseph A. Frame is the chief mechanic at Griffith Observatory in Los Angeles. He is also my uncle. He does wood carving as a hobby, and is really quite an artist at it. His father was a master mechanic and his son is one of the West's best known of the younger artists, Robert A. Frame. Joseph seems to be a traditional generation from the mechanic to the artist, being gifted in both.

The cover mentioned above caught his fancy and herewith is a photograph of his rendition of the Manabí figure in wood. It is finished in a dark earthy gray suggesting the clay of the original. (MRS.) MARIE BUNTON

Mill Valley, California, 12 December 1955.

"Glass balls" of iron

EDITOR, *Pacific Discovery:*

I read with interest the article on glass floats in the last issue of *PD*. It may interest you to know that in Sweden the fishermen use balls made of iron or steel. When I was on Sydkoster Island in June of 1954, with the eclipse expedition from the Academy, I picked up a couple of specimens. The enclosed photograph shows the metal ring through which a rope is passed to attach the float to a net. The ball is eight inches in diameter. The wall is about 1/16 inch thick.

This ball was picked up near the tiny harbor of *Kykrosund*, on the south end of Sydkoster Island, in the Skagerrak. I am also enclosing a photograph of near-by *Eknäshamn*, which is very similar to Kykrosund.

LEON E. SALANAVE

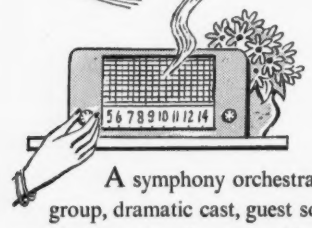
California Academy of Sciences
San Francisco, 15 December 1955.

Space did not allow the use of Mr. Salanave's photo of Eknäshamn. Any more odd-balls?

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